AD_____

GRANT NUMBER DAMD17-96-1-6027

TITLE: Evaluating the Training Needs of Active Duty and Reserve Military General Surgeons

PRINCIPAL INVESTIGATOR: Jeffrey S. Augenstein, M.D., Ph.D.

CONTRACTING ORGANIZATION: William Lehman Injury Research Center
Miami, Florida 33101

REPORT DATE: June 1998

TYPE OF REPORT: Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	June 1998	Final (15 Jun 96 - 14 Jun 98)

4. TITLE AND SUBTITLE
Evaluating the Training Needs of Active Duty and Reserve Military General Surgeons

5. FUNDING NUMBERS
DAMD17-96-1-6027

6. AUTHOR(S)
Jeffrey S. Augenstein, M.D., Ph.D.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
William Lehman Injury Research Center
Miami, Florida 33101

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Medical Research and Materiel Command
504 Scott Street
Fort Detrick, Maryland 21702-5012

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
Accompanying CD-ROM

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

This research program addressed a very important issue, the provision of didactic trauma education. The focus was the development of curriculum definition tools with which to create multimedia lectures: and the lectures themselves. In spite of all of the enthusiasm about computer-aided instruction, there is a paucity of high quality trauma lectures available. This research team is prepared to create an extensive and evolving set of materials that will address the needs of military trauma surgeons. The deficit of the present work is the lack of a formal evaluation of knowledge acquisition and retention as a result of the use of these computer-based education modules. This deficiency can and will be corrected if additional funds are provided.

14. SUBJECT TERMS
Trauma Surgery Training

15. NUMBER OF PAGES
127

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

FOREWORD

Opinions, interpretations, conclusions and recommendations are those of the author and are not necessarily endorsed by the U.S. Army.

____ Where copyrighted material is quoted, permission has been obtained to use such material.

____ Where material from documents designated for limited distribution is quoted, permission has been obtained to use the material.

____ Citations of commercial organizations and trade names in this report do not constitute an official Department of Army endorsement or approval of the products or services of these organizations.

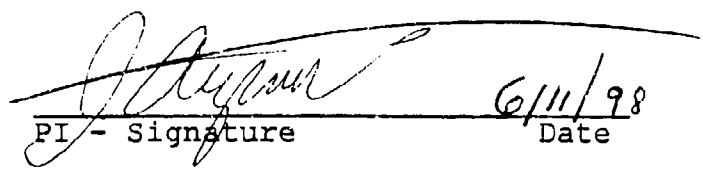
____ In conducting research using animals, the investigator(s) adhered to the "Guide for the Care and Use of Laboratory Animals," prepared by the Committee on Care and Use of Laboratory Animals of the Institute of Laboratory Resources, National Research Council (NIH Publication No. 86-23, Revised 1985).

____ For the protection of human subjects, the investigator(s) adhered to policies of applicable Federal Law 45 CFR 46.

____ In conducting research utilizing recombinant DNA technology, the investigator(s) adhered to current guidelines promulgated by the National Institutes of Health.

____ In the conduct of research utilizing recombinant DNA, the investigator(s) adhered to the NIH Guidelines for Research Involving Recombinant DNA Molecules.

____ In the conduct of research involving hazardous organisms, the investigator(s) adhered to the CDC-NIH Guide for Biosafety in Microbiological and Biomedical Laboratories.



PI - Signature 6/11/98 Date

Table of Contents

INTRODUCTION:

In the past, "trauma surgery" was equated to the treatment of wartime injuries. Much of the early trauma research was generated during acts of international conflict. However, as the civilian world became more injury-prone the lessons learned during wartime became exceedingly applicable to community, university and inner city hospital emergency rooms and operating rooms. Today virtually all publications on the care of injured patients emanate from the civilian world.

As a result of the fortune paucity of wartime activities involving American soldiers, military general surgeons have very little experience in trauma surgery. Yet, these are the very surgeons who will be called on to care for injuries to soldiers in the event of military engagement. The statistics suggest a need to augment the present state of military trauma surgical preparedness. Of the current surgical program directors in military General Surgical training programs, almost none have the combat surgery experience. With the exception of Brooke Army Medical Center in San Antonio, Texas, the only single military center designated as a Level 1 Trauma Center. In trauma systems that designation relates to the highest level of preparedness for injury treatment. In a worldwide survey, Thomas Knuthe, M.D., Maj. MC, found that the average military surgeon performed one laparotomy for trauma every year, operated on one vascular injury every three years and performed a thoracotomy for trauma only every four years. It is doubtful that any surgeon with this degree of experience could maintain an expertise in the field of trauma surgery. As military surgeons will be called upon to exercise their expertise in the event of a conflict, efforts should be focused on this group to augment these much-needed skills.

To that end, efforts are in place to provide training opportunities in civilian academic trauma centers to active duty (American Board of Surgery eligible/certified) general surgeons, acting as staff surgeons in United States Army, Navy and Air Force medical facilities.

The Ryder Trauma Center is a unique training facility for trauma care. It was established through a congressional mandate to create a national model for the treatment of severe injury and opened in 1992. It is staffed by more than two hundred professionals expert in all aspects of trauma care.. The Center encompasses over one hundred and thirty eight thousand square feet within its four floors and basement. At the top, a helipad provides access to even the largest military aircraft. Two elevators, each able to hold a pair of patients, supporting clinicians and equipment, can make the journey to the first floor within fifteen seconds. That level houses five resuscitation bays, a six bed holding unit, four operating rooms, a six bed post-anesthetic recovery unit, a family waiting room, a conference room/press room, an angiographic suite, an ultra-high speed CAT scan, and a stationary x-ray suite. The second floor holds a twenty-bed intensive care/burn unit, additional family waiting rooms, classrooms, and physician and staff offices. The third floor houses sixty routine trauma care beds. The fourth floor is a fifty-bed rehabilitation unit. A computerized medical record-keeping system was developed for this center. It allows for electronic documentation of clinician notes and orders as well as administrative functions such as operating room scheduling. This system provides very powerful tools for additional research and education.

Approximately 4,000 severely injured patients are seen yearly. Half of the injuries are from penetrating wounds, mainly gunshot, and the remainders are due to automobile causes. The amount, severity and diversity of injuries seen in the country's best facilities for treating trauma provide a unique training opportunity at the Ryder Trauma Center.

Additionally, one of the few federally funded centers for injury research, the William Lehman Injury Research Center, is housed in the Ryder Trauma Center. Its focus is injury resulting from motor vehicle crashes. The primary methodology is a multidisciplinary analysis of real automobile crashes involving experts in trauma care, car design and biomechanics. The Lehman Center is the developer of a computerized, multimedia database system to store the hundreds of car crash analyses performed yearly. One of these information systems is a multi-media, computerized self-education system designed to teach clinicians principles of injury control, diagnosis and treatment. This system will be the basis of a formalized educational continuing trauma care training program provided to military surgeons.

A pilot project was proposed that would use the Ryder Trauma Center as a model for continuing trauma care training for military surgeons.

This project would focus on the development of the content of the didactic curriculum. A panel of experts from within the Ryder Trauma Center, military surgery and from other civilian trauma centers would define this educational program. The key factor is the successful development of computerized self-education and evaluation modules. It was proposed that educational packages be developed. Each would include:

- Multimedia lectures
- Reading materials
- Self evaluation tools

A formal evaluation would be performed of these materials in terms of:

- Effectiveness
- Acceptability
- Cost-benefit ratio

This approach addresses one of the major criticisms of post-graduate training in surgery:

- Clinical preceptorship, when available, rarely provides structured didactic education to supplement the hands-on clinical experience.
    - Reading materials that are the typical adjunct are not sufficient for a short-duration clinical experience.
    - Live lectures are rarely provided because of time-constraints of the clinical faculty.
    - The few videotape lectures available are rarely acceptable to viewers.
- The multimedia computerized educational materials developed by the William Lehman Injury Research Center to date have been evaluated as useful and acceptable. The ability to be utilized at the users pace and in an interactive fashion is apparently a key to success with these new technologies. Evaluation of the impact of the experience on the learner's knowledge and/or skill is performed.

BODY
ORIGINAL STATEMENT OF WORK:

TASK 1 - PROGRAM DEFINITION

This task will focus on the definition of needs in a training curriculum for military surgeons. The first step will be an assessment of the current military training curriculum and the development of the content of the didactic curriculum. The second step will be to assess the degree to which computer-assisted multimedia instruction (CAMI) modules could be applied in conjunction with other training to address skill and knowledge needs. The third step will be to define a prototype computer-assisted multimedia instruction module including an evaluation plan.

A panel of five experts from the Ryder Trauma Center, other civilian trauma centers and military surgical centers will be organized to aid in conducting this task. The task will be completed within ninety days of contract initiation. A summary of the program definition plan will be provided to the sponsor.

This one-year project would focus on the development of the content of the didactic curriculum. A panel of experts from within the Ryder Trauma Center, military surgery and from other civilian trauma centers would define this educational program. The key factor is the successful development of computerized self-education and evaluation modules. It is proposed that two complete educational packages be developed. Each will include:

- Multimedia lectures
- Reading materials
- Self evaluation tools

Educational module development will require approximately six months. A formal evaluation will be performed of these materials in terms of:

- Effectiveness
- Acceptability
- Cost-benefit ratio

This approach addresses one of the major criticisms of post-graduate training in surgery:

- Clinical preceptorship, when available, rarely provides structured didactic education to supplement the hands-on clinical experience.
    - Reading materials, which are the typical adjunct, are not sufficient for a short-duration clinical experience.
    - Live lectures are rarely provided because of time-constraints of the clinical faculty.
    - The few videotape lectures available are rarely acceptable to viewers.
- The multimedia computerized educational materials developed by the William Lehman Injury Research Center to date have been evaluated as useful and acceptable. The ability to be utilized at the users pace and in an interactive fashion is apparently a key to success with these new technologies. Evaluation of the impact of the experience on the learner's knowledge and/or skill is performed.

- A fundamental aspect of this proposal is the implementation of formal evaluation of learning.
-

TASK 2 - PROGRAM DEVELOPMENT

Once task 1 is completed, the development of a prototype-training program will begin. It is proposed that a computer-assisted multimedia instruction module be developed. The computer-assisted multimedia instruction (CAMI) module will include:

- Multimedia computerized instruction
- Computerized self evaluation
- Supplemental on-line reading materials and demonstrations

The module will be developed by staff from the Ryder Trauma Center, which will be augmented with an outside consulting company with special experience in preparing CAMI materials.

An estimated six months is required for the technical development of the CAMI module. A copy of the CAMI module will delivered at the end of the contract.

TASK 3 - PROGRAM EVALUATION

Upon completion of task 2, strategies for a formative evaluation of the program (developed under task 1) will be implemented.

The evaluation will be performed in terms of:

- Knowledge retention
- Acceptability to trainees
- Cost to benefit ratio

This formative evaluation will be conducted as follows. An evaluation of the program among the in-house medical staff includes residents, fellows and attendings of the Ryder Trauma Center. The results of the evaluation will be documented and a final report, which summarizes the research done, and the findings will be provided within 12 months of contract award.

Evaluation of Progress

The intent of this project was to develop a trauma surgical curriculum that could be delivered via computer aided instruction. The initial plan was that the multidisciplinary panel would define the curriculum. A number of lectures, able to be delivered on CD-ROM, would then be created. It became clear early in the project that the tools with which to develop multimedia education had to be mastered before high-quality educational modules could be created. Dr. John Armstrong, an officer in the United States Marine Corps, spent two years as a trauma fellow at the Ryder Trauma Center. He actively participated in this project and helped focus the endeavors to meet the needs of military surgeons. He developed some of the first presentations that dealt with, for example, heart injury. It became clear that the first step was to develop lectures using multimedia technology that could be delivered live. The idea was to replace the traditional 35mm slides and occasional videotape with a computer-deliverable presentation.

This team has created over a dozen computer-based presentations. These are listed in

Appendix 1. It was apparent that powerful lectures could be created with the present software and hardware. The initial lectures that were converted to a self-deliverable mode were not viewed as acceptable by the panel of faculty, residents and students who informally evaluated these products. It was of great concern that lectures considered quite acceptable when delivered live was considered unacceptable when self delivered. (The self-delivered lectures contained a professional voice talent reading from the script generated from the live lecture.) Without question a formal approach to storyboarding, scripting and professional voice was required. The lectures provided on the attached CD-ROM reflect this rigorous approach to lecture development.

After a challenging beginning, this group has developed a methodology with which to develop exciting and informative lectures and has developed four lectures. The next phase of research will implement the formal evaluation by faculty, residents and students of this lecture program. The initial ideas for assessing the participants' knowledge acquisition, knowledge retention and overall attitude toward this learning program will be realized in this next phase.

Appendix 2 lists the curriculum that needs to be developed for trauma surgeons. The present modules address an aspect of trauma surgery that has been neglected. This domain is injuries sustained in vehicular crashes. Dr. Armstrong felt that this was the most important initial program. He articulated that in America's last major military encounter, Desert Storm, most of the severe injuries occurred in vehicular crashes. There is presently great enthusiasm among trauma surgeons that improved outcome for victims of vehicular injury can occur if the initial responders at the scene and the emergency department physicians recognize the possibility of severe injuries based on crash configuration and/or occupant position. Data from civilian trauma centers shows that some crash victims who sustained liver and/or aortic injuries actually looked fine initially at the scene. In some cases individuals, who appeared stable at the scene, and were not evaluated in a hospital environment later decompensated, and some died. In most of these cases, information about the crash configuration and/or positioning of the victim at the moment of the crash suggested the possibility of these life-threatening injuries.

Because of these observations, the initial thrust of this lecture program is to provide education on blunt vehicular injury. Three of the lectures address this subject matter. The fourth lecture deals with the new and exciting program funded by United States Department of Transportation, National Highway Traffic Safety Administration and General Motors Corporation. (The working storyboards for these lectures are included in Appendix 3. The scripts for each lecture are included in Appendix 4. A synopsis of each lecture is contained in Appendix 5. This program, which presently involves seven of America's most prestigious trauma centers, is named the Crash Injury Research and Education Network. Its acronym is CIREN. Because of the CIREN program, a wealth of new information is forthcoming on the diagnosis and treatment of blunt vehicular injuries. To understand these injuries, however, a rudimentary background of biomechanics and occupant kinematics is required. The lecture group provided on the CD-ROM is the beginning of this important educational program.

One of the observations that emanated from our faculty surgeons' advisory group was that the educational modules should be capable of being delivered as live lectures and also being

self-deliverable. The present lectures meet that desire. They are designed so that a lecturer can use the modules as if they are very sophisticated 35mm slides. In preparing the lecture the narration and the optional script can provide a training session for the to-be lecturer.

The accomplishments of this grant include:

- The development of an outline of lectures needed in a trauma surgery curriculum.
- The development of a methodology for the creation of self deliverable lectures:
  - Create outline for the educational module
  - Storyboard the lectures
  - Script the lectures
  - Create the lecture in an easy to use presentation software such as Microsoft, Inc., PowerPoint
  - Deliver the lectures to live audiences
  - Evaluate the audience's response
  - Modify as necessary
  - Create the narration in a studio using professional talent
  - Create a self-deliverable module in Macromedia Inc., Director
  - Present the initial self deliverable module to individuals that can evaluate content and usability
  - Evaluate the responses
  - Modify as necessary
  - Create CD-ROMS
- The creation of four CD-ROM based lectures

A number of tools were developed to facilitate the creation of educational modules:

- A video camera boom system that allows the acquisition of video in clinical environments including the operating room and the resuscitation unit.
- A method for cataloging the various multimedia components of lectures.
- Software tools for storyboarding
- Software tools for scripting
- A software module that creates a Macromedia, Inc. Director presentation from the script and multimedia objects.

Pictures of the video boom in use are included in Appendix 6. This is the third iteration of this crucial device. It was developed to capture videographic records of injuries and surgeries. Many of the multimedia objects incorporated into the lectures are obtained from clinical experiences. Video is an ideal source for both still images and action sequences. Presently Hi8 video is obtained as the source. It is then digitized into high-resolution still images, stored as BMP files and video stored as MPEG1. The video boom was developed to allow filming from above the patient. This position is required to characterize most surgeries and to visualize most abdominal and chest organ injuries. The boom folds up and can be easily moved from room to room. The remote controls allow focusing and movement of the camera. To date numerous videos have been obtained with this device. The creation of these lectures requires the integration of very high quality multimedia objects such as video, sound and 3D animations. If materials are catalogued when obtained, a

library of source materials then is available. For example, if a number of chest x-rays that demonstrate pneumothorax are stored, the optimal one for a pediatric trauma lecture can be found. Appendix 7 is the user manual (partial) for a system that was developed to meet this need. The system is named the "Document Management System" (DMS). DMS provides a detailed nomenclature with which to identify objects. Its query language allows complex searches with Boolean connectors. For example, lists of all CAT scan images showing Grade V liver lacerations can be obtained. The list will show a thumbnail image of each x-ray.

Storyboarding lectures was shown to be a necessary step in the creation of a high quality self-deliverable lecture. Appendix 3 shows the storyboards for each of the finished lectures. An application was developed in Microsoft, Inc. Excel that stores the storyboard contents.

An application was developed in Macromedia, Inc. Director that takes a script and converts it to a presentation. The application was programmed in the Lingo language. Appendix 4 shows the script formats and Appendix 5 provides a synopsis of each of the four lectures.

Appendix 8 is the CD-ROM that contains the lectures. It is designed to play on IBM PC type multimedia equipped computers. The instructions for operation are included in Appendix 9. Note that the presentations are chosen from a menu that can and will be expanded as new titles are produced. The user can customize the presentation to meet his or her preferences.

- The delivery can be automatic or manually controlled.
- The written script can be viewed or not viewed.
- The narration can be heard or not heard.

This grant has provided the opportunity to develop a methodology to create an evolving curriculum for trauma care. With the advent of low cost multimedia computers, a very high quality educational program can be provided to military surgeons at their home base. The delivery system could be maintained on a local library of CD-ROMS today. In the near future, a wide area network via the Internet could provide both the lectures and interaction with educators through teleconferencing.

If additional funding were provided, attention would be directed to the development of more lectures and the implementation of a formal evaluation process. The latter would address knowledge acquisition and retention and user acceptance.

CONCLUSIONS:

This research program addressed a very important issue, the provision of didactic trauma education. The focus was the development of curriculum definition tools with which to create multimedia lectures; and the lectures themselves. In spite of all of the enthusiasm about computer-aided instruction, there is a paucity of high quality trauma lectures available. This research team is prepared to create an extensive and evolving set of materials that will address the needs of military trauma surgeons. The deficit of the present work is the lack of a formal evaluation of knowledge acquisition and retention as a result of the use of these computer-based education modules. This deficiency can and will be corrected if additional funds are provided.

Appendices

Appendix 1
Computer-Based Presentations

Invited Lectureships (Selected, showing only last three years)

1998	Presenter – 1998 Miami "Trauma Symposium: Epidimiology and Prevention of Injury." Fountainbleau Hotel. Miami Beach, FL. March 13th.
1997	Society of Automotive Engineering Performance TOPTEC: "Chest Injury Patterns Among Drivers Protected by Airbags." Costa Mesa, CA. August 5th.
1997	Broward General Medical Center: "Crash Research Presentation" Ft. Lauderdale, FL. July 7th.
1997	American Automobile Manufacturers Association: "Side Impact Analysis." Dearborne, MI. June 17th.
1997	Visiting Professor - Methodist Hospital of Indiana: "Injury Patterns with Car Restraint Systems." Indianapolis, IN. April 9th.
1997	National Transportation Safety Board - Air Bags and Child Passenger Safety: Panel 2: Air Bag-Induced Injuries - Who Vulnerable and How Do We Know It? Washington, DC. March 17th.
1997	SAE International: "Heart Injuries Among Restrained Occupants in Frontal Crashes." Detroit, MI. February 25th.
1997	Discussant: "Trauma Registry Injury Coding is Superfluous - A comparison of Outcome Prediction Based Upon Trauma Registry and Hospital Information System ICD-9 Codes." Sanibel, FL. January 15th
1997	Fourth Annual Trauma Symposium: "Mechanism of Injury in an Automobile Crash: How Safe are you Really in your Automobile?" Fort Lauderdale, FL. February 13th.
1996	Medical School 101: "Trauma and Triumph." University of Miami School of Medicine. October 31st.
1996	"Cutting Edge in Critical Care." Jackson Memorial Hospital, Department of Nursing Education. Miami, Fl. September 19th.

1996	Automotive Occupant Restraints Council, Annual General Meeting – Second Technical Session Speaker. Orlando, Fl. March 14th.
1996	Traumatic Brain Injury 1996 - The Miami Experience: "The Biomechanics of Automobile Crash-Related Neurotrauma." University of Miami Division of Continuing Medical Education. February 3rd.
1995	International Conference on Pelvic and Lower Extremity Injuries: "Data Collection System for Clinical and Trauma Research." Washington, DC. December 6th.
1995	Florida Symposium on Highway Safety: "The William Lehman Injury Research Center: Its Mission and Scientific Findings Related to Airbags and Safety Belts." Tampa, FL December 1st.
1995	Speaker at the Ft. Lauderdale Surgical Society: Mechanics of Car Crash Injuries." Ft. Lauderdale, FL November 16th.
1995	Surgical Grand Rounds: "Computers in Surgery." University of Miami School of Medicine. Miami, FL. October 12th.
1995	Neurotrauma to Neurorehabilitation: "A Continuem of Care" - Case Management. Trauma/Neurosurgery/Rehabilitation. University of Miami/Jackson Memorial Hospital. Miami, FL. October 6th.
1995	Briefing: The William Lehman Injury Research Center's Research on Injuries to Restrained Occupants in Frontal Crashes." Washington, DC. September 15th.
1996	"Progress of the William Lehman Injury Research Center." Briefing to the staff of the Centers for Disease Control and Prevention. Atlanta, GA. July 20th.
1995	Injury Severity Scaling/Scoring Briefing Conference. Annapolis, MD. July 12th.
1995	"Computerized Data Collection Methods for Crash Research" Briefing to General Motors Safety Staff. Detroit, MI. June 21st.

Appendix 2
Curriculum

Modular Course Outline

General Traumatic Injury

I. INTRODUCTION

- Mechanisms of injury
- Initial evaluation: primary resuscitation, resuscitation, secondary survey

II. ABDOMINAL

Exploratory celiotomy: general management

Evaluation and management of specific intraabdominal injuries

- Liver
- Spleen
- Genitourinary
- Pancreas and duodenal (see attached outlines)
- Vascular

III. THORACIC

Exploratory thoracotomy, including management of cardiac and aortic injuries

IV. NEUROLGICAL

Evaluation and management of head injuries, to include epidural and subdural evacuation

V. MAXILLOFACIAL

Evaluation and management of maxillofacial trauma

VI. ORTHOPEDIC

- Management of orthopedic injuries
- Cervical spine, including application of tongs
- Pelvic fractures, including application of external fixator
- Long bone fractures, including application of external fixators

VII. ENVIRONMENTAL

Evaluation and management of environmental injury

- Burns
- Hypothermia
- Nuclear, biological, chemical weapon exposure

VIII. BIBLIOGRAPHY

Modular Course Outline

Blunt Traumatic Injury In Motor Vehicle Crashes

I. INTRODUCTION
- Perspective
- Problem Statement
- Approaches To the Problem

II. CRASH INJURY RESEARCH METHODOLOGY
- Perspective of National Crash Injury Research
  - National Transportation Safety Board
  - U.S. Department of Transportation
  - National Highway Traffic Safety Administration
  - Research and Development
  - National Center for Statistical Analysis
  - National Automotive Sampling System
  - Crash Injury Research Engineering Network
- National Automotive Sampling System Methodology
- Crash Injury Research and Engineering Network

III. CRASH PHYSICS
- Newtonian Laws Applied to Motor Vehicle Crashes
  - Crush Damage
  - DeltaV
  - PDOF

IV. OCCUPANT KINEMATICS AND NEWTONIAN LAWS

V. CRASH CONFIGURATIONS AND CHARACTERISTICS
- Frontal Collisions
  - Full Frontal Impact
  - Narrow Frontal Impact
  - Offset Frontal Collision
- Side Impact Collisions
  - Impact Location In Side Collision
  - Narrow Impact Side Collision
  - Incompatible Vehicles In Side Impacts
- Rollover Collisions
- Rear Impact Collisions

Modular Course Outline

Duodenal Injury

I. ANATOMY

D1-4, crosses L2-3
Ligament of Treitz
Blood supply

II. MECHANISM

Penetrating most common
Blunt: crushing (against vertebral column), bursting, sheer

III. CLASSIFICATION

Hematoma
- Grade 1: single portion of duodenum
- Grade 2: more than one portion of duodenum

Laceration
- Grade 1: partial thickness, no perforation
- Grade 2: disruption < 50 % circumference
- Grade 3: D2—disruption 50 - *75 %* circumference DI,3,4—disruption 50 - 100% circumference
- Grade 4: D2—disruption> *75 %* circumference involvement of ampulla or distal common bile duct
- Grade 5: Massive disruption of duodenopancreatic complex

Vascular
- Grade 5: devascularization of duodenum

IV. REPAIRS (EXPOSURE)

Intramural duodenal hematoma: exclude perforation; observe
Duodenorrhaphy, with or without tube decompression
Resection and primary anastomosis (Dl,3,4)
Roux-en-Y duodenojejunostomy
Diverticulization
Pyloric exclusion
Pancreatico duodenectomy

V. SEVERITY OF INJURY

Agent: stab vs. blunt/missile
Size: <75 %wall vs.>75%
Site: D3,4 vs. D1,2
Repair interval: <24 hrs vs. >24 hrs
Adjacent injury: No CBD vs. CBD

Modular Course Outline

Pancreatic Injury

I. ANATOMY

Relationships to duodenum, SMY/SMA, splenic artery/vein, spleen, vertebral column

Pancreatic duct

Blood supply: superior/inferior anterior/posterior pancreaticoduodenal arcades, doral artery, great pancreatic artery, transverse pancreatic artery

Average 3.5 associated injuries/patient

II. MECHANISM

Penetrating 2/3, blunt 1/3

60% blunt injury due to steering wheel impact

Major duct injury 15%

III. CLASSIFICATION

Hematoma: No duct injury; I—minor; II—major

Laceration: I—superficial

II-major without duct injury or tissue loss

III.-distal transection or parenchymal injury with duct injury

IV-proximal transection or parenchymal injury involving ampulla

V-massive disruption of pancreatic head

IV. REPAIR

Exposure: Kocher manuever, extended Kocher; Mattox maneuver

Duct evaluation: ERCP, duodenotomy, open duct, cholecystocholangiogrm

Principles: control hemorrhage, bacterial contamination; debride devitalized pancreatic tissue; preserve 20-50% of functional pancreatic tissue; provide adequtae internal or external drainage of pancreatic injuries or resections

Ascertain: associated organ injuries (esp. duodenum); degree of pancreatic parenchymal disruption; integrity of main pancreatic duct/ampulla

Options:

external drainage (closed suction, sump) distal pancreatectomy

distal pancreatectomy with or without Roux-en-Y pancreaticojejunostomy

duodenal diverticulization

pyloric exclusion

pancreaticoduodenectomy

feeding jejunostomy

V. COMPLICATIONS

Fistula: 10—35% of significant injuries

Abscesses: 35% in pancreatic trauma patients, but only 5% true pancreatic

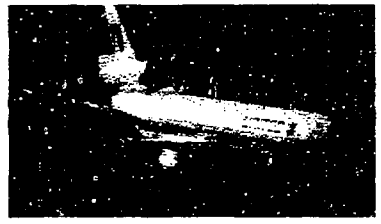
Secondary hemorrhage: 10%

Pseudocysts: <5%

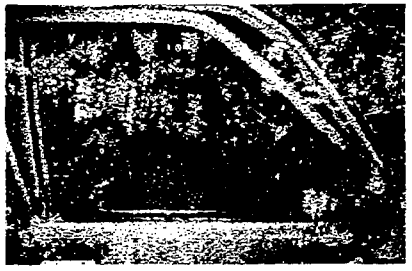
Pancreatitis: 13%; hemorrhagic pancreatitis < 2%, 80% mortality

Appendix 3
Storyboards

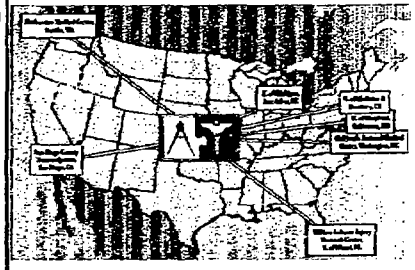
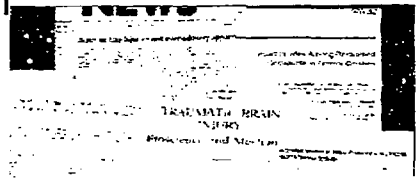
SLIDE	Narrative	Text	Image	Image Path
1		INTRODUCTION		
	In the US, motor vehicle travel is the primary mode of transportation with 177 million licensed drivers and over 200 million passenger vehicles on the road.	200 Million Passenger Vehicles 177 Million Licensed Drivers		Jaz: Introduction: 1Traffic.jpg
2				
	Motor vehicle safety is an on going national health concern due to the magnitude of injuries and preventable deaths resulting from passenger vehicle crashes.	National Health Concern		Jaz: Introduction: 2Deadcar.jpg
3				
4	In 1996, there were 6.8 million police reported crashes in the US. *These crashes resulted in 3.5 million* injuries and 42, 000 deaths.	6.8 Million Crashes Annually 3.5 Million Injuries 42, 000 Deaths	42,000 Deaths 3.5 Million Injuries 6.8 Million Crashes Per Year	Jaz: Introduction: 3Pyramd.jpg
5	The death rate is equivalent to one every 12.5 minutes, 4.8 deaths per hour, or 115 deaths per day.	One Traffic Fatality Every 12.5 Minutes 4.8 Deaths Per Hour 115 Deaths Per Day 365 Days Per Year	Text	

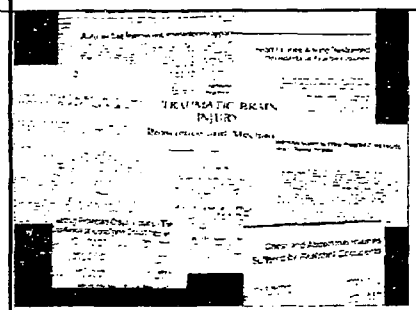
SLIDE	Narrative	Text	Image	Image Path
6	This is the same effect as if a major airline crash occurred every single day of the year.	MVC Death Rate Equals One Airline Crash Every Day of the Year		Jaz: Introduction: 4Plane.jpg
7	Death from motor vehicle crashes is the leading killer of all persons from 5-34 years old.	#1 Killer of Young People		Jaz: Introduction: 5Kids.jpg
8	The societal cost resulting from these crashes is over 150 billion dollars annually.	150 Billion Dollars Per Year	Text	

SLIDE	Narrative	Text	Image	Image Path
9	The collaborative efforts of government and the automotive industry have improved occupant safety and vehicular Crashworthiness in recent years. Seat belt design and usage laws have reduced death between 40-55% according to the National Safety Council.	Seat Belts - Reduction of Deaths by 40 55%		Jaz: Introduction: 6Natsafc.jpg 7Buckle.jpg 8Buckup.jpg
10	Air bag technology has enhanced the efficacy of belt usage, with a decrease of 26% in belted driver and 14% in belted passenger fatalities.	Air Bags and Seat Belts - 26% Reduction in Driver Deaths 14% Reduction in Passenger Deaths		Jaz: Introduction: 9ABDummy.jpg
11	Currently, 71 million passenger's vehicles are equipped with e driver air bags and 42 million with right front passenger air bags. To date, 2.1 million air bags have deployed. This number is expected to proportionately increase as the fleet of vehicles with air bags continues to expand.	As of 1998: 71 Million Cars Have Driver Air Bags 42 Million Cars Have Right Front Passenger Air Bags 2.1 Million Air Bag Deployments		Jaz: Introduction: 10ABDeploy.jpg
12		**PROBLEM STATEMENT**		

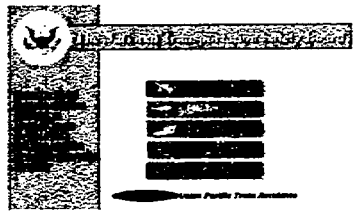
SLIDE	Narrative	Text	Image	Image Path
13	In spite of these safety efforts, the national rates for motor vehicle death and injury remain alarmingly high.	Restraint protected occupants are still being injured or dying in MVC's		Jaz: Introduction: 11Vicscen.jpg
14	In 1996, the fatality rate was 1.7 for every 100 million miles traveled, translated to 15,8 deaths out of a population of 100 million. The injury rate was 142 per 100 million miles traveled.	Annually - 1.7 Deaths per 100 Million Miles 15.8 Deaths per 100 Million Population 142 Injuries Per 100 Million Miles		Jaz: Introduction: 12Highway.jpg
15	45% of all blunt trauma victims admitted to a trauma emergency department in 1996 sustained injuries in a motor vehicle collision.	MV Crash Occupants Comprise 45% Of All Blunt Trauma Emergency Room Admissions		Jaz: Introduction: 13Resus.jpg

SLIDE	Narrative	Text	Image	Image Path
16	Emergency care providers, including on scene EMS, police and ED physicians, are challenged with increasingly difficult decisions regarding triage and emergent intervention in crashes where the occupant is protected by one or both of the existing safety systems. This is due to the fact that the occupant may not appear injured externally and may not initially meet criteria for transport. This is because the belt systems keep them positioned in the vehicle and the air bags protect the head, neck and upper torso from contacting the hard interior surfaces of the vehicle.	Challenge to First Responders and ED Physicians: Restraint Protected Occupants May Not Appear Injured		Jaz: Introduction: 14ABArticle.jpg
17				Jaz: Introduction: 15Geometry.jpg
18	The danger is in the possibility of missing an occult internal organ injury that may not be symptomatic at the scene of the crash, but may be fatal over a short time period. Medical personnel must incorporate non-traditional assessment data in making decisions about crash victims.	Clinicians Must Make Medical Decisions Using Non Traditional Assessment Data		Jaz: Introduction: 16OccultArticle.jpg 17TRUBay.jpg

SLIDE	Narrative	Text	Image	Image Path
19	As vehicular safety technologies change and expand into the fleet of vehicles, additional criteria for occupant assessment will be needed.		 	Jaz: Introduction: 18HorseandWagon.jpg 19NewCars.jpg
20		**APPROACHES TO THE PROBLEM**		
21	A network of hospital based crash injury research programs throughout the nation is providing supplemental data to government and industry regarding the cause of injuries in restraint protected occupants. They incorporate clinical, biomechanical, engineering and crash investigation data in analyzing each individual case. The graphic shows the name and location of each center.	Hospital Based Crash Injury Research Crash Injury Research and Engineering Network C.I.R.E.N.	 	Jaz: Introduction: 20CIREN_Map

SLIDE	Narrative	Text	Image	Image Path
22	These centers are providing valuable insight to emergency room physicians, clinicians and EMS personnel regarding injury patterns and predictors of injury on the basis of crash information.			Jaz: Introduction: 21ArticleCollage
23	. The objectives of these studies are: 1. To reduce preventable deaths 2. To facilitate the early recognition of injury potential in a motor vehicle crash 3. To provide information that will assist in triage determinations 4. To assist clinicians in making informed treatment decisions 5. To provide immediate feedback to government and industry regarding injury causation and vehicle safety performance. 6. To develop an efficient educational process for dissemination of critical information on a national level.	CIREN Objectives: Reduce Preventable Death Facilitate Early Recognition of Injury Potential Assist First Responder In Triage Assist Clinicians in Medical Management Feedback to Government and Industry Develop Mechanism for Education	Text	
24	The content herein will provide detailed information regarding processes, methodologies, findings and clinical implications from these medical center studies.		Fade Out	

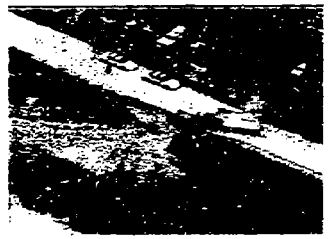
Education Module 2: Methodology

	TITLE: CRASH INJURY RESEARCH METHODOLOGY:			
Slide #	**Narrative:**	**Text:**	**Graphic:**	**Image Path**
1	Since the late 60's, the federal government has dedicated extensive resources to understanding the problems associated with the growing volume of motor vehicles on our nation's highways. Most current public information about crash injury research is largely the result of governmental efforts to improve motor vehicle safety. As a frame of reference, a brief outline of these government agencies, their functions and resources is provided. Hospital based crash injury research program development and purpose is explained. The methodology of study is defined.	CRASH INJURY RESEARCH METHODOLOGY	Graphic Showing Interrelationships of Government Agencies	
2	The National Transportation Safety Board is an independent Federal agency whose congressional mandate is to investigate accidents in civil aviation and other mass transport modes, which have national significance. The NTSB has no regulatory or enforcement powers but has been highly successful in shaping transportation safety improvements. This agency is completely independent of the United States Department of Transportation.	NTSB Independent Federal Agency Mass Transport and Civil Aviation with Issues of National Interest Regulatory Power Influential Deals No Highly		Jaz: Methodology: 01ntsb.jpg

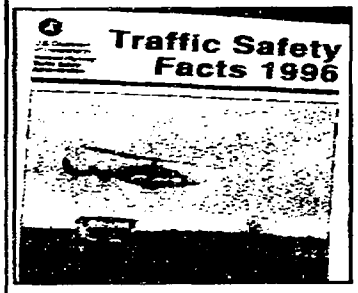
Education Module 2: Methodology

Slide #	Narrative:	Text:	Graphic:	Image Path
3	Motor vehicle crash injury research efforts on a national level are coordinated through the United States Department of Transportation. The DOT is primarily responsible for transportation safety improvements and enforcement of Federal regulations for all modes of transportation.	UNITED STATES DEPARTMENT OF TRANSPORTATION		Jaz: Methodology: 2Slide_DOT.jpg
4	Within the DOT is the National Highway Traffic Safety Administration.	NHTSA	NHTSA People Saving People 	Jaz: Methodology: 3Nhtsa.jpg 4_30yr_logo.jpg
5	This administration is specifically responsible for reducing deaths, injuries and economic losses resulting from motor vehicle crashes.	NHTSA Mission: Reduce Deaths, Injuries, Economic Losses From Motor Vehicle Crashes	Text	
6	NHTSA proposes legislation regarding motor vehicle safety and coordinates research programs throughout the country designed to; improve vehicular and occupant safety.	Proposes Legislation Coordinates National Research	Text	
7	The Research and Development division of NHTSA provides the richest source of national crash injury data through the National Center for Statistics and Analysis.	RESEARCH AND DEVELOPMENT Division of NHTSA National Crash Injury Data	NCSA National Center for Statistics and Analysis	Jaz: Methodology: 5Ncsa.jpg

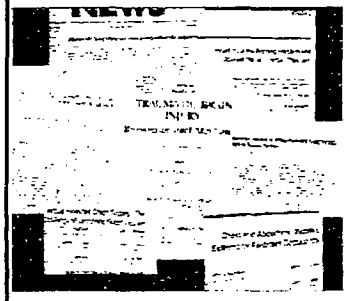
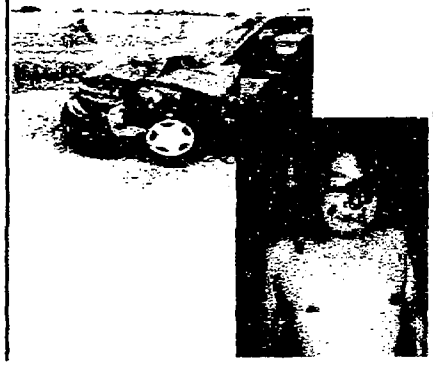
Education Module 2: Methodology

Slide #	Narrative:	Text:	Graphic:	Image Path
8	The NCSA operates the National Automotive Sampling System - Crashworthiness Data System that was established in 1979.	NASS	Text	
9	The mission of NASS is to reduce motor vehicle crashes, injuries and deaths throughout the United States. This data system provides detailed information on a representative random sample of 5 thousand crashes per year.	NASS Mission: Reduce Motor Vehicle Crashes, injuries and Deaths Random Sample of 5000 Crashes Each Year	Text	
		NASS METHODOLOGY	Text	
10	NASS has 24 field teams throughout the United States and studies crashes involving passenger cars, light trucks, vans and utility vehicles. Crash investigators obtain crash and scene data, locate and inspect the vehicles and crash scenes, measure vehicle damage, take photographs and identify interior occupant contacts. These investigators also interview crash victims and review medical records retrospectively to extract injury data.	24 Field Teams Nationally Passenger Cars, Light Trucks, Vans, Utility Vehicles Crash Investigators - Crash Scene and Vehicle Identify Occupant Contacts Abstract Medical Record Data Retrospectively		Jaz: Methodology: 6Overhead Scene.jpg
11	The data is entered into an electronic database and is maintained by NASS. It is used, in part to assess overall issues related to traffic safety, to obtain detailed data on vehicular performance and to increase knowledge regarding the nature of crash injuries.	Electronic Data System Used To: Highlight Traffic Safety Issues Provide Insights Into Vehicular Performance Issues Improve Understanding of Crash Injuries		

Education Module 2: Methodology

Slide #	Narrative:	Text:	Graphic:	Image Path
12	The NASS data system is used extensively by crash researchers and is considered a valid, scientific database. The limitations for using this data alone are twofold: the medical record information, as the sole source of injury data, is not always accurate or complete; secondly, the time delay in data release is between 1 ½ to 2 years. Considering the rapidity of technological advances in vehicle safety engineering and design, this time delay can be problematic in providing feedback to government regulators and to the automotive industry.	NASS Limitations Retrospective Medical Record Data May Be Incomplete Data Release Time Delay 1-2 Years		Jaz: Methodology: 7SafeFact.jpg
13		CRASH INJURY RESEARCH AND ENGINEERING NETWORK		
14	In response to the need for contemporaneous crash injury data and timely feedback regarding vehicle safety performance, in 1991 NHTSA, under Congressional mandate, created 4 hospital based crash injury research teams whose mission was to integrate detailed medical and injury information with biomechanical engineering principles and crash investigation data in an effort to create a scientific understanding of motor vehicle blunt traumatic injuries and to provide immediate feedback regarding vehicle safety systems and crashworthiness.	Congressional Mandate in 1991 Established 4 Hospital Based Crash Injury Research Centers Mission: To Create a Scientific Understanding of *Blunt Trauma Related to MVC's* *To* Provide Immediate Feedback		

Education Module 2: Methodology

Slide #	Narrative:	Text:	Graphic:	Image Path
15	The collaborative efforts of medical experts, safety and biomechanical engineers, police/fire rescue personnel, experienced crash investigators and crash injury statisticians have yielded much useful information regarding the relationship of injury mechanism and severity to vehicle crashworthiness and safety systems.	Collaboration Between: Physicians Medical Experts Safety Engineers Biomechanical Engineers Police Fire Rescue Personnel Crash Investigators Epidemiologists Producing Insightful Information		Jaz: Methodology: 8Collage.jpg
16	In 1996, 3 additional centers were added and the Crash Injury Research Engineering Network was formed. This was an unprecedented collaboration between medicine, biomechanical engineers, automobile manufacturers, safety engineers and government regulators.	CIREN Organization Formed in 1996 Representing an Unprecendented Collaboration Between Government Regulators, Medical Professionals, Automobile Manufacturers, Engineers		
17	This multi-center national research program is providing in-depth studies of crashes, injuries and treatments to improve processes and outcomes. The goal of this shared expertise is to advance the scientific understanding of blunt trauma in motor vehicle crashes and to identify practical opportunities for safety improvements.	Multi-Center Approach Detailed Crash Analysis Contemporaneous Injury Data Collection Goal: *Improve Understanding of Vehicular Blunt Trauma* and To Improve Occupant Safety		Jaz: Methodology: 9DamVehicle.jpg 10Person.jpg

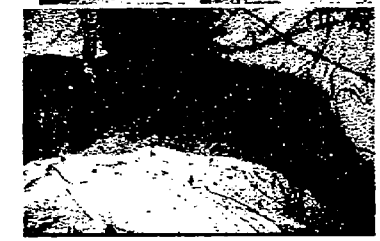
Education Module 2: Methodology

Slide #	Narrative:	Text:	Graphic:	Image Path
18	Each CIREN center has a full time crash team comprised of physicians, clinical research associates, project coordinators and crash investigators. Consulting biomechanical engineers and safety engineers participate in case analysis and reconstruction.	Team Composition: Physicians Clinical Researchers Crash Investigators Biomechanical Engineers Safety Engineers Nursing Personnel Police EMS		Jaz: Methodology: 11War room.jpg
19	Every center is required to have undergone their respective investigation review board process in order to ensure absolute privacy and confidentiality of patient data. Written consent to participate in the study is required.	Patient Privacy and Confidentiality Assured All Studies Are Approved by Investigational Review Processes	Text	
20	The network has defined study criteria to include restrained occupants (with the exception of children) in Frontal, Near Side Impact, or Rollover Crashes, who are severely injured (as defined by AIS 3 or > injuries) admitted to a trauma facility. The vehicle must be less than 8 years old and available for inspection, and the case occupant must consent to participate. Children under 12 years old are included regardless of seating position, type of impact or restraint use.	Study Criteria All Children 12 Years and Younger Restrained Occupant Frontal Impact Near Side Impact Rollover Injury Severity of AIS 3 or > Admitted Vehicle Less Than 8 Years Old	Text	

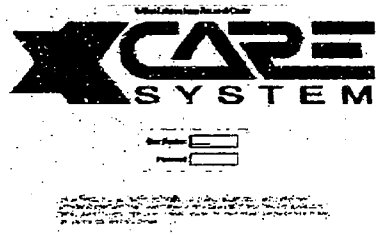
Education Module 2: Methodology

Slide #	Narrative:	Text:	Graphic:	Image Path
21	Upon admission of a blunt trauma resulting from motor vehicle crash, the research center crash team is notified. The initial clinical screening process begins in the trauma emergency room at the time of patient arrival. The clinical researcher interviews accompanying EMS and police personnel regarding crash description, evidence of restraint use on scene, availability of scene photographs, and other relevant crash information. The clinical researcher observes the vehicle occupant for evidence of external injury and photographic images are obtained.			Jaz: Methodology: 12Heliport.jpg 13Resus Arrival Video.mpg 14Interview in Resus.jpg

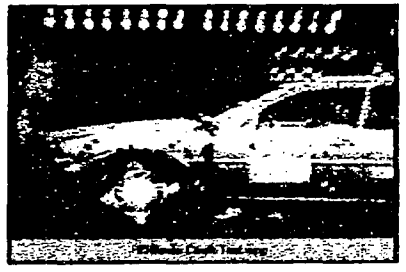
Education Module 2: Methodology

Slide #	Narrative:	Text:	Graphic:	Image Path
22	External injuries, including minor cuts, contusions or abrasions, called "witness marks", are critical factors in confirming restraint use and in assisting to identify occupant contacts within the vehicle. Patient images taken in the trauma emergency room often provide the only documented evidence of external injury. They are also very useful in case analysis when the body type and stature of the occupant may be pertinent to understanding mechanism of injury.		 	Jaz: Methodology: 15Video In Resus 16Beltmark
23	Once the clinical researcher determines that the occupant meets criteria and has signed consent, a parallel field investigation is begun. The crash investigator is notified and is responsible for locating and inspecting the case vehicle, the principle other vehicles involved in the crash and the scene within the shortest time period possible. Once again, time is a critical factor in preserving evidence of occupant contacts within the vehicle.			Jaz: Methodology: 17Jim in field

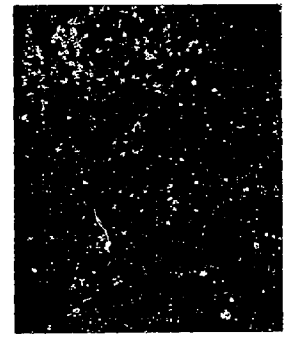
Education Module 2: Methodology

Slide #	Narrative:	Text:	Graphic:	Image Path
24	The clinical researcher follows the patient from admission to discharge and for up to six months after the crash. Clinical and crash data are entered into an electronic data system, which includes a multimedia library of patient, scene, vehicle and diagnostic images.			Jsaz: Methodology: 18ccare.jpg
25	Once all data is recorded, the case is subjected to an in-house preliminary review with an interdisciplinary team of experts. This critical analysis of crash dynamics, occupant kinematics, injury mechanisms and vehicular performance is conducted a minimum of 3-4 times before a case is considered ready for release to CIREN.			Jsaz: Methodology: 19multid.jpg
26	Once a case is released, it is available for review by other centers wishing to compare similar cases. The extent of the review processes and scrutiny by other centers objectifies and validates each hypotheses and case analysis. Statisticians assess aggregated data from individual centers for emerging or existing injury patterns and incorporates data from the National Accident Sampling System Data Base to project a national estimate.	Quality Control Through Validation Reviews		

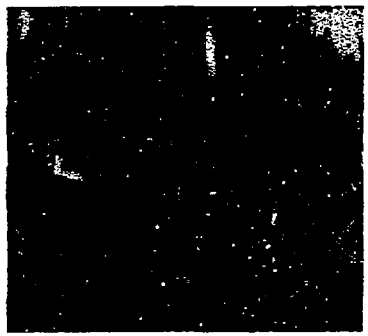
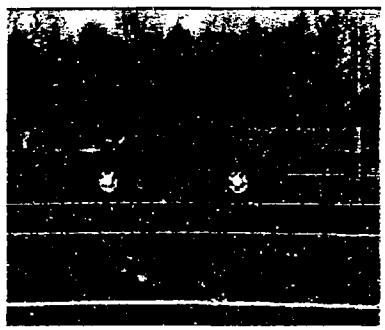
Education Module 2: Methodology

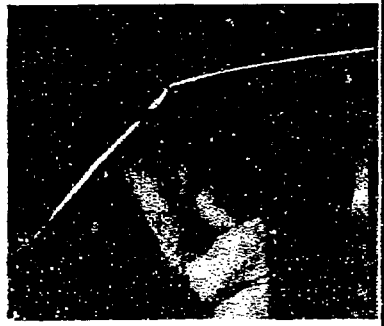
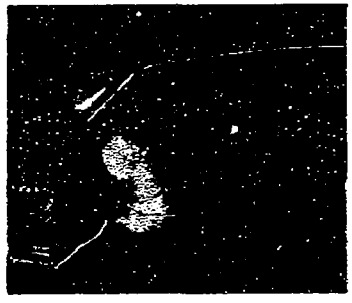
Slide #	Narrative:	Text:	Graphic:	Image Path
27	Research findings are used: by government regulators to effect changes in safety standards; by automobile manufacturers to improve vehicle safety performance; by biomechanical engineers in the design and testing of anthropomorphic dummies; and by EMS and emergency medical professionals to improve the emergent assessment, triage and treatment of motor vehicle crash victims.		  	Jaz:: Methodology: Ncac.mpg 21Barrier Crash Test 22EMS Removing Victim

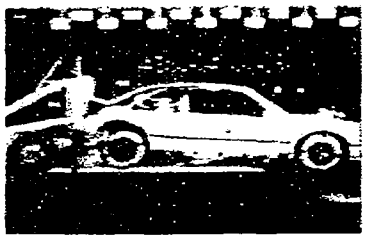
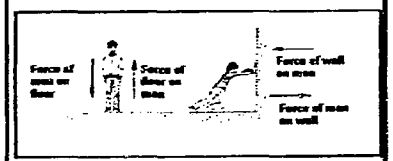
STORYBOARD: MODULE 3: PHYSICS OF A CRASH

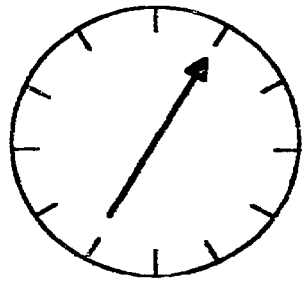
Slide #	TITLE: PHYSICS OF A CRASH Narrative	Text	Graphic	Path
1	Sir Isaac Newton defined the physical laws, which govern how a vehicle and its occupants react in a collision. Understanding the laws and how they affect the vehicle and occupants will help in identifying potential injury patterns associated with various crash forces.			Physics of a Crash\Newton.jpg
2	The basis for Newton's theory of motion are the following three laws.	Newton's Laws of Motion		

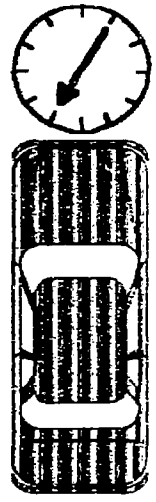
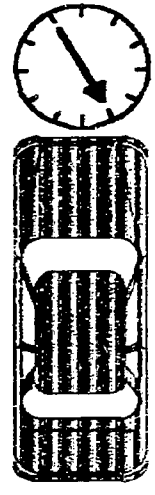
STORYBOARD: MODULE 3: PHYSICS OF A CRASH

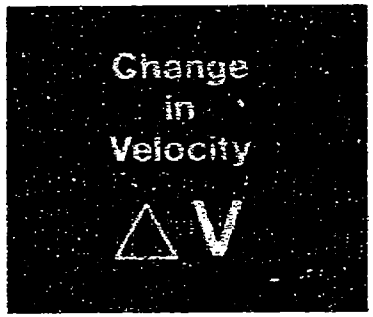
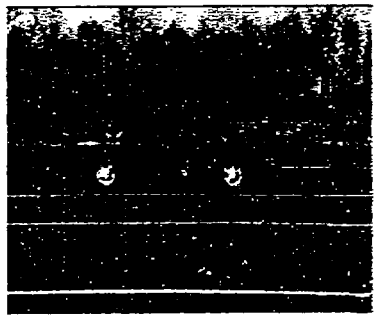
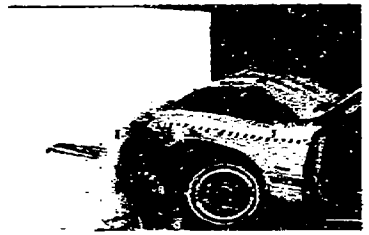
3	Newton's first law: The velocity of a body on which no forces act cannot change. Simply stated this means that a body at rest will remain at rest until acted upon by an outside force, and a body in motion will remain in motion until acted upon by an outside force. Friction is a force that is universally present. As an example, if you were standing still the friction between the bottom of your shoes and the ground acts as a force that keeps you still. In order to achieve motion we need to apply a force, which compensates for the force of the friction, thereby canceling it out and creating motion.	Newton's First Law: A body at rest will remain at rest, and a body in motion will remain in motion, unless acted upon by an outside force.		
4	Newton's first law means that a vehicle at rest will remain at rest until acted upon by an outside force, which compensates for the tire/road surface friction that is keeping it still. To achieve motion we need to simply apply a force, which cancels out the friction and induces motion. The simple act of stepping on the accelerator induces a force, which is greater than the tire/road surface friction thereby canceling it out and inducing motion.			Physis of a crash\ Vehicle accelerating.mpg
5	The same laws apply to stopping a vehicle. A vehicle in motion will remain in motion until acted upon by an outside force. When the brakes are applied in a controlled stop, the friction force being applied by the brake shoes to the wheel creates that outside force, which effects the velocity of the body in motion.			Physics of a crash\Vehicle braking.mpg

6	This also applies to an occupant of the vehicle in motion. The occupant is moving at the same velocity of the vehicle. When the outside force is applied to the vehicle to slow its momentum, the occupant continues to move forward at the same velocity until an outside force acts upon the occupant to slow its momentum. In the case of a belted occupant, the restraint webbing is that outside force which effects the momentum of the occupant.		Physics of a crash\belted dummy.mpg
7	It is easy to imagine what happens to an occupant when the restraint is not worn. In the event of a crash, the occupant continues in motion at the same velocity, until it strikes a component of the vehicle interior. The striking of an interior component is the outside force, which effects the momentum of the occupant. This component could be the steering wheel, or the instrument panel or the windshield.		Physics of a crash\unbelted dummy.mpg

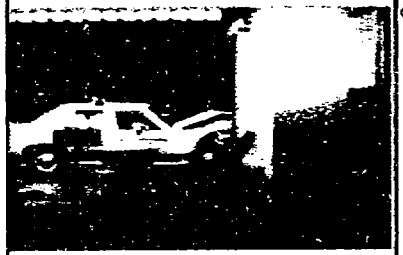
8	Newton's second law states that acceleration along a direction in space is caused by a force acting along that direction and is independent of forces acting in orthogonal directions. Basically, to move, a force needs to be applied to the body, along the same direction that the movement is desired. In addition it also determines how much force is required to accelerate, to change the velocity of, a body. The greater the mass the smaller the acceleration for a given force. As an example, if 100 pounds of force is applied to a 50-pound object it will induce a greater velocity than the same 100 pounds of force being applied to a 100-pound object.	Newton's Second Law: Whenever a force acts upon a body, it produces an acceleration in the direction of the force, that is proportional to the force and inversely proportional to the mass of the body.		Physics of a crash\Newton's second.mpg
	Newton's third law appears simple yet its content is subtle and often misunderstood: Every force has an equal but opposite "reaction" force. Newton once wrote: "What ever draws or presses another is as much drawn or pressed by that other." As an example, if you should push on a wall with your hand, the wall experiences a force from your hand, but also your hand experiences the same but opposite direction of force from the wall. This opposite but equal "reaction" force determines the direction an occupant will move inside a vehicle that's momentum was changed due to some external force.	Newton's Third Law: For every action there must be an equal and opposite reaction		Physics of a crash\physics.jpg

9	To further understand the physics of a crash it is necessary to understand some of the terms, which will be used in the subsequent modules and how they relate to a vehicle and Newton's laws of motion.	Words common in crash physics		
10	PDOF	PDOF: Principal Direction of Force		
11	In crash dynamics the PDOF or principal direction of force is the direction from which the outside force is being applied to the vehicle. The PDOF is expressed in time as it relates to a clock face. In other words, the clock face is divided into 30-degree "hourly" increments with 12 o'clock being the front of the vehicle and 6 o'clock the rear plane of the vehicle.			Physics of a crash\clock face.jpg

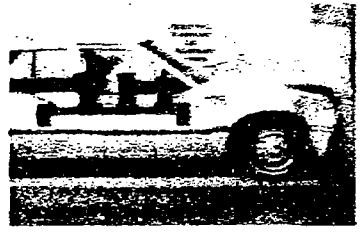
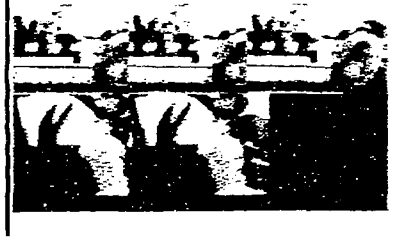
12	Therefore, if the vehicle sustains an impact with a 1 o'clock principal direction of force that means that the striking force was applied to the vehicle at an angle that was 30 degrees to the right of the longitudinal axis of the vehicle. Furthermore, this force can be applied to the side structure as well. In other words it is entirely possible to have a 12 o'clock to a 6 o'clock direction of force impact to either of the side structures of the vehicle.		Physics of a crash\pdof.jpg
13	Conversely, a vehicle that sustained an 11 o'clock direction of force impact was struck by a force that was applied 30 degrees to the left of the vehicles longitudinal centerline. The PDOF is important because it is directly related to the movement of the occupants inside the vehicle during the crash sequence.		Physics of a crash\pdof #2.jpg

14	DeltaV In physics the term "Delta" signifies a change. The V is an abbreviation for velocity. When used together the term DeltaV simply means a change in velocity.	"DeltaV is a Change in Velocity"		
15				Physics of a crash\DeltaV.jpg
16	One might think then that a high DeltaV has the potential for serious consequences. However, if a high DeltaV is realized over a significant period of time then the effects are minimal. For example, if a vehicle is traveling 50 mph and the driver applies the brakes and slows to a stop over a period of 20 seconds then the effects of the DeltaV are minimal.			Physics of a crash\Vehicle braking.mpg
17	Now take the same vehicle traveling 50 mph and strike a solid barrier. The vehicle will stop much quicker and the effects of the DeltaV are much more significant.			Physics of a crash\Vehicle into barrier.mpg

STORYBOARD: MODULE 3: PHYSICS OF A CRASH

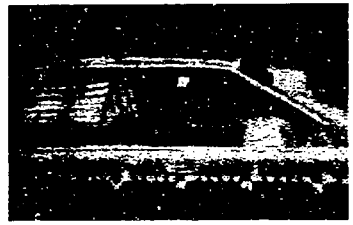
18	It is known through study that the life span of the average crash is 100 milliseconds or 1/10th of a whole second and the DeltaV peaks within that period of time. Therefore, we can assume that the DeltaV sustained in a crash, takes place within 1/10th of a second of the initiation of the collision. That's about the time it takes to blink the eye. This rapid deceleration, in a very small time frame, usually results in injury or death.			Physics of a crash\real time crash.mpg
19	This logical assumption allows the first care provider to make a visual assessment of the vehicle damage and determine the potential for serious injury.			Physics of a crash\Severly Damaged Vehicle.jpg
20	CRUSH DAMAGE	CRUSH DAMAGE		
21	As a vehicle crashes into an object, the vehicle sustains damage along the initial plane of contact. The damage that results from the collision is called crush damage and is usually measured in inches or centimeters.			Physics of a crash\Lateral Crush Damage.jpg

22	Crush damage can be directly related to the speed of the vehicle at impact, with the basic assumption, that the faster the vehicle is going the greater amount of crush damage that will be sustained. Of course there are several other factors that determine the DeltaV of a vehicle in a crash.			Physics of a crash\Crush Damage.jpg
23	However, for the purpose of our study it is safe to estimate the DeltaV in a crash based on the amount of crush damage the vehicle in question sustained. Crush damage can be a valuable tool in estimating the severity of a crash as well as the potential for injury of the occupants.			Physics of a crash\Heavy Damage.bmp
24	A rule of thumb to remember is that "Every inch of crush damage that a vehicle sustains equals 1 mph of DeltaV". What this means is, if a vehicle sustained 24" of crush damage then the DeltaV can be estimated to be 24 mph. You must be aware that an estimate of DeltaV, based on the depth of crush, may often be overestimated. However, it is much safer to overestimate the speed change when making an assumption about injury potential than it is to underestimate the DeltaV.	Rule of Thumb: "1" of Crush Damage equals 1 mph of DeltaV"		
25	OCCUPANT KINEMATICS	OCCUPANT KINEMATICS		

26	Occupant kinematics is the scientific study of how a body moves inside a vehicle that has been subjected to impact forces. Thus by combining Newton's laws of physics with human anatomy and physiology, certain predictions can be made regarding the likelihood of an occupant sustaining personal injury from a given crash configuration.	Occupant Kinematics: The study of how an occupant moves inside a vehicle during a crash.		
27	What needs to be stated and understood about occupant kinematics and injury causation is that every vehicular collision involves three impacts. First, the vehicle itself strikes an object resulting in a collision. As the vehicle crushes against the object, energy is dissipated and crush damage results.			Physics of a crash\Kinematics impact 1.mpg
28	When sufficient energy is used up and the vehicle stops moving, the occupants inside still continue to move until their bodies collide with either the restraint system, if belted, or some other interior component of the vehicle.			Physics of a crash\Kinematics impact 2.mpg
29	Finally, when the body stops moving, the internal organs continue to move, striking the body cavity walls resulting in internal injuries.			Physics of a crash\Kinematics impact 3.mpg

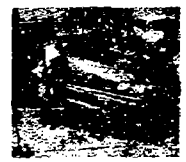
STORYBOARD: MODULE 3: PHYSICS OF A CRASH

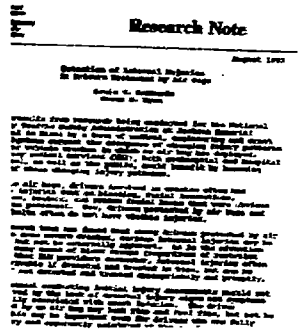
30	Now, let's discuss how Newton's laws of motion effects an occupants movement in a vehicular collision.	Newton's Laws and Occupant Kinematics		
31	Newton's first law states that a body in motion will remain in motion until acted upon by an outside force.	Newton's First Law: A body in motion will remain in motion until acted upon by an outside force.		
32	Earlier we discussed the three-impact phenomenon. That was when the first impact was the vehicle to the object, Then the occupant to a component in the vehicle interior, and finally, the internal organs striking inside the body. This is a perfect example of Newton's first law in action.	Three Impact Phenomenon 1st: Vehicle to object 2nd: Occupant to object inside vehicle 3rd: Internal organs to body cavity		
33	However, the first law of motion also applies to the movement of the head. For instance when the torso is stopped by the restraint system, the head of the occupant continues to move forward until it reaches the maximum point of forward rotation.			Physics of a crash\Belted Dummy #2.mpg

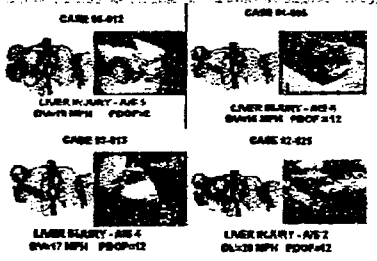
34	Often the head may strike the upper portion of the steering wheel rim even though the restraints are worn.			Physics of a crash\Dummy head into sw rim.mpg
35	Now imagine if the occupant was not belted. The occupant would continue to move at the same speed of the vehicle until it struck something inside the vehicle.			Physics of a crash\unbelted dummy #2.mpg
36	Newton's third law states that for every force there is an equal and opposite reaction force. We can apply this law to an occupant's motion in any collision that occurs. Looking at the principal direction of force in the collision is the predictor that tells what direction an occupant will move in a collision.	Newton's Third Law: That for every force there is an equal and opposite reaction force.		Physics of a crash\Occupant Kinematics.jpg

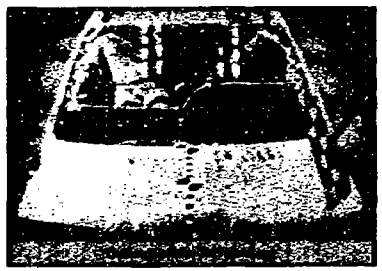
37	The impact forces being applied to the vehicle would cause an equal and *opposite reaction force* to the occupant inside the vehicle. What this means is that the occupant always moves towards the direction of force. An example is that if a vehicle is struck in a 1 o'clock direction of force then the occupant inside the vehicle will always move in a 1 o'clock direction inside the vehicle.			Physics of a crash\dummy to side pdof.mpg
38	In Review This module discussed Newton's three laws of motion and how they apply in a vehicular collision. Also discussed was the principal direction of force, crush damage and how they relate to the DeltaV.	In Review Newton's Three Laws of Motion PDOF Crush Damage DeltaV		
39	Finally we discussed occupant kinematics and how Newton's laws effect an occupants motion inside the vehicle during a collision. Subsequent modules will discuss in greater detail the physical characteristics of the different types of vehicular crashes, safety restraint systems, mechanism of blunt trauma injury and various injury patterns seen.			

	TITLE: LIVER INJURIES ASSOCIATED WITH 2 POINT BELT RESTRAINTS			
Slide #	**Narrative**	**Text**	**Graphic**	**Image Path**
1	Since August of 1991, the William Lehman Injury Research Center at the University of Miami School of Medicine has conducted over 300 interdisciplinary investigations of injured motor vehicle crash occupants in both frontal and side impact collisions.	The William Lehman Injury Research Center University of Miami School of Medicine Crash Injury Research Study 1991 - 1998		Jaz: Injury Mechanism: Liver Injury:1Logo 2Crashed.jpg
2	An observed pattern of liver lacerations suffered by drivers wearing shoulder belts without the lap belt fastened was reported by the Lehman Center in January, 1994, based on early data from the first 29 months of the crash injury research study.	1994 Injury Pattern Discovered Liver Laceration, Right Posterior Lobe	 	Jaz: Injury Mechanism: Liver Injury: 3Liver Anatomy 6Post_Liiver_Lateral.jpg

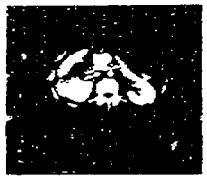
		Drivers Restrained with Shoulder Harness Only		Jaz: Injury Mechanism: Liver Injury: 4Belt Geometry
		Right Front Vehicle Damage		Jaz: Injury Mechanism: Liver injury: 5Right Front Damage
		Supported By Shoulder Belted Cadaver Crash Test		Jaz: Injury Mechanism: 7Cadaver Shoulder Belt Test.mpg
3	At that time, 8 cases of drivers restrained with an automatic shoulder harness who sustained liver lacerations were identified. In three of the original 8 cases, the liver injuries were occult. Two additional risk indicators appeared to be a trend in these 8 cases. The principal direction of force was between 12 and 2 o'clock and the vehicle damage was generally to the right front.	EARLY FINDINGS 8 Drivers Sustained Right Posterior Liver Lacerations		

		All Wore Shoulder Harness 3 Out of 8 - Occult PDOF Between 12 - 2 O'Clock Right From Vehicle Damage		
4	A review of the NASS data system for the years between 1988 to 1992 confirmed that the pattern observed by the Lehman Center was a new mechanism of injury not previously reported. The NASS data revealed a very low occurrence of liver injuries in drivers, less than 0 4%.	National Accident Sampling System 1988-1992 Data Confirmation of New Liver Injury Mechanism Data Findings: All Drivers with Liver Injuries - Less than 0.4%		Jaz: Injury Mechanism: Liver Injury: 8NHTSLOG.jpg
5	Based on these preliminary findings, the National Highway Traffic Safety Administration issued a News Release to EMS personnel throughout the nation. The message conveyed was to consider use of an automatic shoulder belt by a driver involved in a frontal collision as a possible indication of internal organ injury.	National EMS Alert issued by National Highway Traffic Safety Administration		Jaz: Injury Mechanism: Liver Injury: 9NHTSA Release.jpg
6	DATA SUMMARY: Since 1993, the occurrence of this pattern has continued. Out of a sample size of 308 crash cases, 78 occupants sustained liver injuries of AIS 2 or greater severity. 56 are drivers and 22 are passengers. The use of an automatic shoulder belt without the lap belt used occurs in 21% of all cases (n=66). Of these 66 occupants, 55 are drivers and 11 are passengers.	CURRENT DATA: -Total Sample Size = 308 -78 Total Liver Lacerations (25%) of all Occupants		

		56 Drivers (23% of all Drivers)with Liver Lacerations (Compared to NASS Findings of <0.4%) Harness Only = 55 (23% of All Drivers)		
7	Within the subset of drivers restrained by an automatic shoulder belt, 28 (51%) sustained a right lobe liver laceration with an AIS of 2 or greater severity.	Total Drivers Restrained by SB Only = 55 28 Drivers Right Lobe Liver Laceration 51% of Drivers wearing a Shoulder Belt Only		
8	The secondary risk indicators of a principal direction of force between 12 and 2 o'clock holds true in 23 out of the 28 cases with a consistent pattern of right front vehicle damage.	23 Out Of 28 PDOF Between 12 - 2 O'Clock Right Front Vehicle Damage		Jaz: Injury Mechanism: Liver Injury: 10cars and livers and dv.jpg
		MECHANISM OF INJURY		
9	The National Crash Analysis Center at George Washington University maintains an extensive library of crash test films for the United States Department of Transportation.	NCSA	NCSA National Center for Statistics and Analysis	Jaz: Injury Mechanism: Liver Injury: 11ncsalogo.jpg
10	Crash films involving similar case occupent vehicles have been reviewed. These are 30-MPH barrier crashes where the dummy was restrained by an automatic shoulder belt without the lap belt fastened. It is evident in these films that the 2-point belt provides *very good control of head movement. However, with* the lap belt absent the pelvis continues to move forward causing the shoulder belt to apply an exaggerated force to the region of the liver.			Jaz: Injury Mechanims: Liver Injury: 13FrezFrame.jpg

11	In 11 O'clock and 1 O'clock rigid barrier tests, when the crash vector is from the same side as the lower belt anchor, (11 O'clock for the passenger, 1 O'clock for the driver), the unbelted shoulder rotates away from the belt and the upper torso moves towards the direction of force. The result is penetration, extreme loading and ride up of the lower belt to the lower rib cage with potential liver injury to the driver or spleen injury to the passenger.		Jaz: Injury Mechanism: Liver Injury: 12Frontal Test.mpg
	CURRENT ISSUES:		
12	The manufacturing of automatic belt systems was intended to improve the use of seat belts in the United States and, in fact, was highly effective in accomplishing this goal. The high shoulder belt use rate for motorized 2 point belts, between 92-97% in 1995, contributed significantly to raising overall belt use. As a consequence, the segment of the population which might otherwise be unrestrained receives some protection.		Jaz: Injury Mechanism: Liver Injury: 14Person with 2 Pt. jpg
13	A major issue in crashes where the driver is restrained by the automatic shoulder belt is the fact that they often do not appear injured at the scene. The shoulder belt affords them some degree of head and chest protection and, unless lower extremity injuries are apparent, these drivers many times do not show any significant external injuries. In addition, the crash itself may not be severe and vehicle damage at the scene appears to be minor.		Jaz: Injury Mechanism: Liver Injury: 15car.jpg; 16Cadaver.jpg 17Person.jpg

14	These facts present a significant challenge to first responders in making triage determinations at the scene. Clear cut Trauma Center admission criteria may not apply to these occupants such that transport determinations are left to the discretion of the paramedic on the scene.	
15	To illustrate further, within the Lehman Center data, over 50 % of drivers with liver lacerations in crashes where an automatic shoulder belt was used had occult injuries. The fatality rate in this subset was 40%.	5 were taken to a local ED – 1 died. 1 was arrested for DUI and died in jail. 5 were admitted with high suspicion of injury – 1 died. 3 died at the scene or within a short time after the crash.
16	The severity of injury from a liver laceration can range from a minor subcapsular contusion that is treated conservatively to a massive laceration resulting in disruption of over 50% of the hepatic vasculature with vena cava involvement which requires emergent operative intervention. The difficulty is that the severity of injury is not always manifest at the scene yet the slightest delay in treatment may result in death. Given that a CT Scan is the only definitive diagnostic tool for liver laceration severity and location, appropriate triage is critical.	



Jaz: Injury Mechanism: Liver Injury: 18CT_Liver.jpg; 19CT2Liver.jpg

17	Although most vehicle manufacturers have recently discontinued the installation of motorized belt systems, it is estimated that 55 million passenger cars on the road today are equipped with this form of belt restraint.	55 Million Vehicles Have Automatic Restraints		Jaz: Injury Mechanism: Liver Injury: 20Man_2PtBelt.jpg
		RECOMMENDATIONS		
18	The integration of non-traditional assessment data by first responders and ED physicians is critical to the prevention of unnecessary death in cases of blunt trauma related to a motor vehicle crash.	The integration of non-traditional assessment data by first responders and ED physicians		
19	It is recommended that the following factors be ascertained, reported and considered when medical decisions must be made regarding motor vehicle crash occupants:	CONSIDERATIONS		
	1. Evidence that an automatic shoulder belt was in use without a lap belt.	1. Evidence that an automatic shoulder belt was in use without a lap belt.		Jaz: Injury Mechanism: Liver Injury: 12Frontal Test.mpg
	2. Principal direction of force between 12 and 2 o'clock.	2. Principal direction of force between 12 and 2 o'clock.		
	3. Frontal impact with right front damage.	3. Frontal impact with right front damage.		Jaz: Injury Mechanism: Liver Injury: 22Right Front Damage.jpg
	4. Possible moderate to low crash severity (crush).	4. Possible moderate to low crash severity (crush).		

Appendix 4
Scripts

Sample Configuration File

#1#
T~L~INTRODUCTION

#2#~media\1Traffic.jpg
BP~M~200 Million Passenger Vehicles
BP~M~177 Million Licensed Drivers
CAP~S~In the United States, motor vehicle travel is the primary mode of transportation with 177 million licensed drivers and over 200 million passenger vehicles on the road.

#3#~media\2Deadcar.jpg
T~M~National Health Concern
CAP~S~Motor vehicle safety is an on going national health concern due to the magnitude of injuries and preventable deaths resulting from passenger vehicle crashes.

#4#~media\3Pyramid.jpg
BP~M~6.8 Million Crashes Annually
BP~M~3.5 Million Injuries
BP~M~42,000 Deaths
CAP~S~In 1996, there were 6.8 million police reported crashes in the US. These crashes resulted in 3.5 million injuries and 42, 000 deaths

#5#
BP~L~One Traffic Fatality Every 12.5 Minutes
BP~L~4.8 Deaths Per Hour
BP~L~115 Deaths Per Day
BP~L~365 Days Per Year
CAP~S~The death rate is equivalent to one every 12.5 minutes, 4.8 deaths per hour, or 115 deaths per day.

#6#~media\4Plane.jpg
BC~M~MVC Death Rate Equals One Airline Crash Every Day of the Year
CAP~S~This is the same effect as if a major airline crash occurred every single day of the year.

#7#~media\5Kids.jpg
T~M~#1 Killer of Young People
CAP~S~Death from motor vehicle crashes is the leading cause of death for all persons 5 to 34 years old.

#8#
T~L~150 Billion Dollars Per Year
CAP~S~Society's cost resulting from these crashes is over 150 billion dollars annually.

#9#~media\6Nasafco.jpg~media\7Buckle.jpg~media\8Buckup.jpg
LH~M~Seat Belts
LB~M~Reduction of Deaths by 40-55%
CAP~S~The collaborative efforts of government and the automotive industry have improved occupant safety and vehicular Crashworthiness in recent years. Seat belt design and usage laws have reduced death between 40 and 55% according to the National Safety Council.

#10#~media\9ABDummy.jpg
LH~M~Air Bags and Seat Belts
LB~M~26% Reduction in Driver Deaths
LB~M~14% Reduction in Passenger Deaths
CAP~S~Air bag technology has enhanced the effectiveness of belt usage, with a decrease of 26% in belted driver and 14% in belted passenger fatalities.

#11#~media\10ABDeploy.jpg
As of 1998:
BP~M~71 Million Cars Have Driver Air Bags
BP~M~42 Million Cars Have Right Front Passenger Air Bags
BP~M~2.1 Million Air Bag Deployments
CAP~S~Currently, 71 million passenger vehicles are equipped with driver side air bags and 42 million with right front passenger side air bags. To date, 2.1 million air bags have been deployed, and this number is expected to increase dramatically as the fleet of air-bag equipped vehicles continues to expand.

#12#~media\11Vicscen.jpg
BC~M~Restraint protected occupants are still being injured or dying in MVC's
CAP~S~In spite of these safety efforts, the national rates for motor vehicle death and injury remain alarmingly high.

#13#~media\12Highway.jpg
LH~M~Annually:
LB~M~1.7 Deaths per 100 Million Miles
LB~M~15.8 Deaths per 100 Million Population
LB~M~142 Injuries Per 100 Million Miles
CAP~S~In 1996, the death rate was 1.7 for every 100 million miles traveled. This translates to an annual death rate of 15.8 for a population of 100 million. The injury rate was 142 for every 100 million miles traveled.

#14#~media\13Resus.jpg
BC~M~MV Crash Occupants Comprise 45% Of All Blunt Trauma Emergency Room Admissions
CAP~S~45% of all blunt trauma victims admitted to a trauma emergency department in 1996 sustained injuries in a motor vehicle collision.

#15#~media\14ABArticle.jpg
BC~M~Challenge to First Responders and ED Physicians: Restraint Protected Occupants May Not Appear Injured
CAP~S~Emergency care providers, including on scene EMS, police and ED physicians, are challenged with increasingly difficult decisions regarding triage and emergent intervention in crashes where the occupant is protected by one or both of the existing safety systems. This is due to the fact that the occupant may not appear injured externally and may not initially meet criteria for transport

#16#~media\15Geometry.jpg
CAP~S~External injuries often do not appear because belt systems keep the occupant positioned in the vehicle and the air bags protect the head, neck and upper torso from contacting the hard interior surfaces of the vehicle.

#17#~media\16OccultArticle.jpg~media\17TRUBay.jpg
BC~M~Clinicians Must Make Medical Decisions Using Non Traditional Assessment Data
CAP~S~When external injuries do not appear, there is a danger of missing an occult internal organ injury that may not be symptomatic at the scene of the crash, but may be fatal over a short time period. Medical personnel must incorporate non-traditional assessment data in making decisions about crash victims

#18#~media\18HorseandWagon.jpg~media\19NewCars.jpg
CAP~S~As vehicular safety technologies change and expand into the fleet of vehicles, additional criteria for occupant assessment will be needed.

#19#~media\20CIRENMap.jpg
LH~M~APPROACHES TO THE PROBLEM
LB~M~Hospital Based Crash Injury Research
LB~M~Crash Injury Research and Engineering Network
LB~M~C.I.R.E.N.
CAP~S~A network of hospital based crash injury research programs throughout the nation is providing supplemental data to government and industry regarding the cause of injuries in restraint protected occupants. They incorporate clinical, biomechanical, engineering and crash investigation data in analyzing each individual case. The graphic shows the name and location of each center

#20#~media\21ArticleCollage.jpg
CAP~S~These centers are providing valuable insight to emergency room physicians, clinicians and EMS personnel regarding injury patterns and predictors of injury on the basis of crash information.

#21#
LH~M~CIREN Objectives:
LB~M~Reduce Preventable Death
LB~M~Facilitate Early Recognition of Injury Potential
LB~M~Assist First Responder In Triage
LB~M~Assist Clinicians in Medical Management
LB~M~Feedback to Government and Industry
LB~M~Develop Mechanism for Education
CAP~S~The objectives of these studies are:
1. To reduce preventable deaths
2. To facilitate the early recognition of injury potential in a motor vehicle crash
3. To provide information that will assist in triage determinations
4. To assist clinicians in making informed treatment decisions
5. To provide immediate feedback to government and industry regarding injury causation and vehicle safety performance.
6. To develop an efficient educational process for dissemination of critical information on a national level.

The content in these modules will provide detailed information regarding processes, methodologies, findings and clinical implications from these medical center studies.

#end#

Using the Crash Injury Research Template

The template uses a configuration file that lists all text, graphics, and MPEG files that are used in each slide. A sample copy of this file is included in a separate document.

The purpose of this configuration document is to allow Director to import all the media from a directory and place it in the cast and score. Using this template allows the user to start with a base level presentation that can then be modified and/or refined using standard Director tools (resizing type, moving or resizing picture elements, etc.)

Configuration File

Each slide in the configuration file begins with the "#slide_number#" tag (ex. #1# is slide number 1). After this tag, all the graphic or MPEG files are listed using a path relative to the Director template file. Each item is delimited using the "~" character. Here is an example:

#5#~physicsmedia\vehicle accelerating.jpg~physicsmedia\newton.jpg

The remaining lines in the configuration file specify the text that appears in the slide as well as the narration text that appears in the optional window at the bottom of the screen.

There are five pre-defined styles that can be attached to any piece of text that appears within the slide:

1. Title (T)
2. Bullet Point (BP)
3. Body Copy (BC)
4. List Heading (LH)
5. List Body (LB)

A secondary indicator that is presently unused (but must be inserted) is a size tag:

1. Large (L)
2. Medium (M)
3. Small (S)

A subsequent version of the template file will allow the user to implement size styles.

The last entry for each slide is the narration text which appears in an optional window at the bottom of the screen.. For this use the tag "CAP~S~".

Here is an example:

BP~M~Bullet Point 1
BP~M~Bullet Point 2
CAP~S~This is the text that appears at the bottom of the screen to accompany the narration. This is the text that appears at the bottom of the screen to accompany the narration.

Sound files are not included in the configuration file. They must be named according to the slide number (ex. "#2#snd.aif") in a separate directory accessible to the template file.

To generate the cast members and score layout in the template file, you must do the following:

1. Open the Template file (lecture.dir) and rename it to your destination file name.

2. Go to frame 10.

3. Open Director's Message window (Ctrl-M)

4. Type "importSetupFile configuration file name, sound files directory"
(example: "importSetupFile Òintroduction.txtÓ, Òintrosounds")

5. You will see some flashing occur on the stage, and marker numbers will appear. This is normal. Once the flashing stops, you will have a populated stage.

6. Drag the members in channels 40 through 46 to the last marker of the presentation. These are the interface buttons at the bottom of the screen.

7. Delete frames 1 through 9, so that marker #1 in on frame 1.

8. On the first marker, drag channel 41 to frame 3 so that the "previous" button doesn't appear.

9. On the last marker, drag channel 42 to the last frame of the previous marker, so that the "forward" button doen't appear.

9. If you imported any MPEG cast members, you will need to reimport them using the "DirectMedia" xtra, and switch the MPEG cast members in the score with the new DirectMedia cast members. All MPEG cast members are in channel 15. DirectMedia provides a more flexible way of handling MPEG files than the standard MCI controls.

10. On the last frame, drag out all occupied channels one extra frame and place a marker named "end". In the script channel, add the following script:

```
on exitframe
        Go to movie "Lehman"
end
```

11. Now you can customize or refine the presentation using standard Director tools.

Appendix 5
Lecture Synopsis

Module 1 - Introduction

42,000
Deaths

3.5 Million
Injuries

6.8 Million
Crashes Per Year

Module 1 will discuss some basic information relating to automotive research today. You will learn about the collaborative efforts of government and the automobile industry, what the real problem are facing the driving population, what the problems are facing first providers and emergency department physicians and most importantly what can be done to solve some of the problems we face today in the area of crashworthiness research.

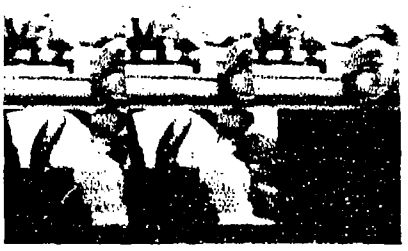
Module 2 – Methodology

Module 2 will discuss the methodolgy used in the United States today to collect data related to automobile crashes, the injuries and or deaths they produce and the economic losses related to them. We will learn what specific data the United States Department of Transportation (USDOT) collects and how it is used in automotive research.

An overview is provided of one of USDOT newest programs. You will learn about the governments response to the need for contemporaneous crash injury data and timely feedback regarding vehicle safety performance. In 1991 NHTSA under a Congressional mandate, created hospital –based research teams. Their mission was to integrate detailed medical and injury information with biomechanical engineering principles and crash investigation data in an effort to create a scientific understanding of motor vehicle blunt traumatic injuries.

This program began with four hospital-based crash injury research teams. With the success of three teams, USDOT in 1996 added three additional centers to form the Crash Injury Research Engineering Network (CIREN).

Module 3 – Physics of a Crash

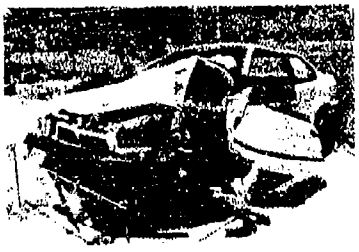


Module 3 will discuss basic physical laws as they apply to how a vehicle and its occupants react in a collision. Understanding the laws and how they affect the vehicle and occupants will help in identifying potential injury patterns associated with various crash forces. You will learn how these laws apply to an occupant of a vehicle in motion.

This module will also provide an overview of occupant kinematics. This is the scientific study of how a body moves inside a vehicle that has been subjected to impact forces. Therefore, by combining Newton's laws of physics with human anatomy and physiology, predictions can be made regarding the likelihood of an occupant sustaining personal injury from a given crash configuration.

Module 3 will also help you understand some of the basic "crash" terms, including: *crush zone, delta V, and maximum crush* which will be used in the subsequent modules and how they relate to a vehicle and Newton's laws of motion.

Module 4 – Liver Injuries Associated with 2-Point Belt Restraints

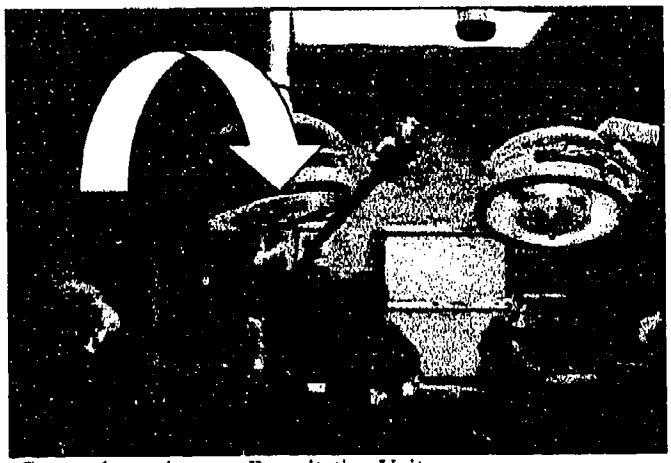


Module 4 will discuss an injury pattern associated with shoulder belts (no lap belt) and the methodology used to document the problem. Since August of 1991, the William Lehman Injury Research Center (founding CIREN member) at the University of Miami School of Medicine has conducted over 300 interdisciplinary investigations of injured motor vehicle crash occupants in both frontal and side impact collisions. An observed pattern of liver lacerations suffered by drivers wearing shoulder belts without the lap belt fastened was reported by the Lehman Center in January, 1994, based on early data from the first 29 months of the crash injury research study.

Also discussed in module 4 will be the importance of reviewing statistical databases. As one example the William Lehman Injury Research Center used the NASS data set (1988 to 1992) to help confirm the liver injury pattern observed, was a new mechanism of injury not previously reported.

Appendix 6
Images of Video Boom

Photographs of Camera Boom in the Resusitation Unit



Camera boom in use – Resusitation Unit

Using the Camera Boom in a Busy Clinical Area is Simple.

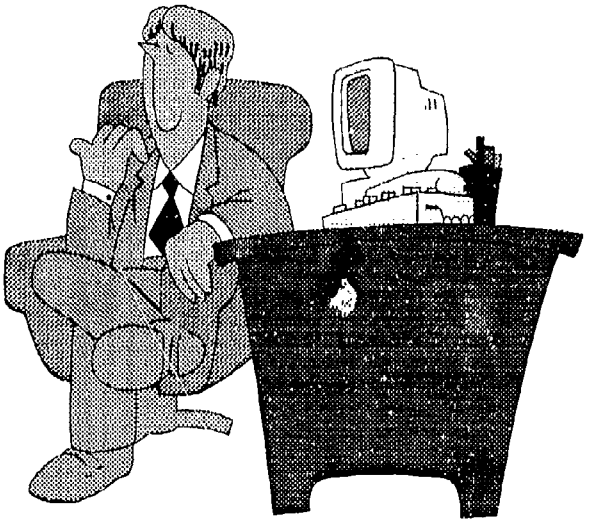
Close-up of Camera Boom Console

Appendix 7
Document Management System Manual
(partial)

(Pages 5 - 24 not included)

DOCUMENT MANAGEMENT SYSTEM (DMS)

Version 1.0



User's Guide

By

Madhu Doraiswamy

Contents

Pages 5 - 24 not included

Introduction

An Overview

The **Document Management System (DMS)** is an office management tool that manages any type of office document. It can also be called an Office Assistant as it manages the documents for you and also retrieves them as and when you need them without having you go through any major hassle.

Features

What does DMS actually do for you ?

1. **Scans** office documents like Letters, Proposals, Written Requests etc and also References / Articles from Newspapers or Magazines.

2. **Imports** WORD documents, EXCEL spreadsheet, POWERPOINT presentation, HTML files, ASTOUND presentation, NOTEPAD files, already scanned document etc.

3. **Search** the documents by keywords, Titles, Authors and also by Journals in case of References.

4. Maintains an **Inventory** of the hard copy of the documents in the filing cabinets.

5. Allows users to **Privatize** each document. Documents can be made Private, Public or Selective access to certain users only.

6. Extensive **Flexibility** to the User by providing the viewing of the documents either by :
   * Document Type : Reference, Letter, Proposal etc
   * Category : Department, Clients etc

7. In case of References, allows importing of **PROCITE** files without having to re-enter the information again.

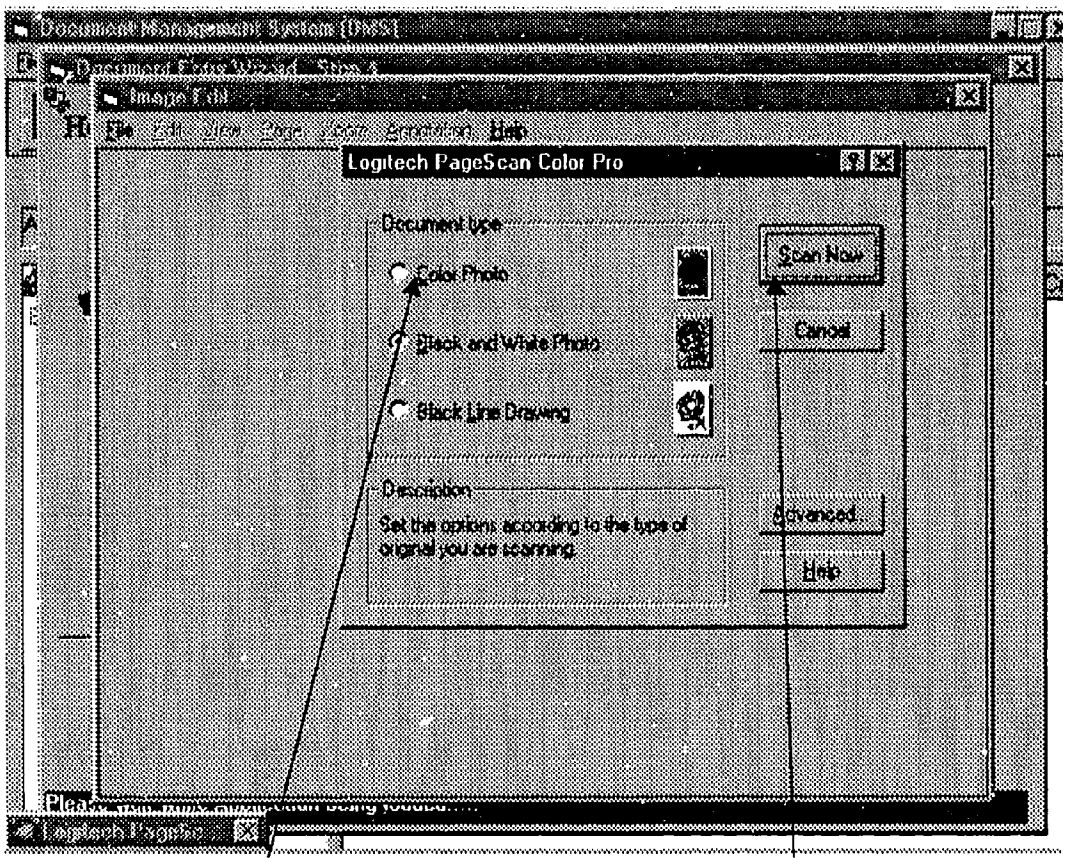
8. In case of misplacement of the hard copy of the document, can **Print** a copy of the document from the system.

9. Allows **Delegation** of various steps involved. Eg : Scan Later - Generate Label Now option. This feature explained in detail in later pages.

After you click on the 'OK' button on the previous screen, the scanner driver gets activated depending on the type of scanner you machine is hooked to.

The screen below displays the 'Logitech PageScan Color Pro' scanner driver activated.

Depending on whether you would like to scan color document or Black & White document make your selections below and click on the 'Scan Now' button.



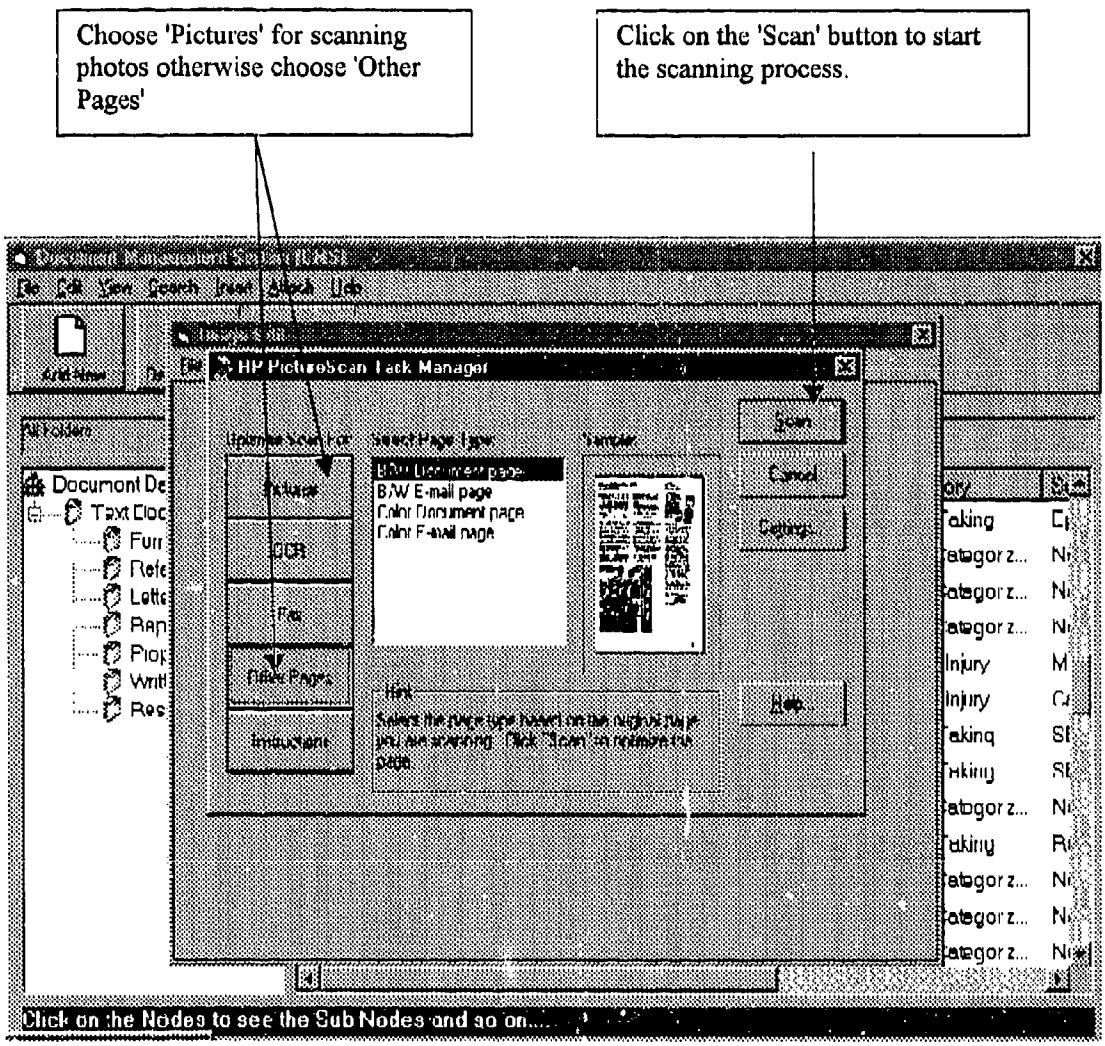
Click on the 'Color Photo' for scanning color documents or 'Black & white photo' for B & W documents.

After making your selections click on the 'Scan Now' option.

If your machine is hooked on to an HP Scanner then the following scanner driver gets activated.

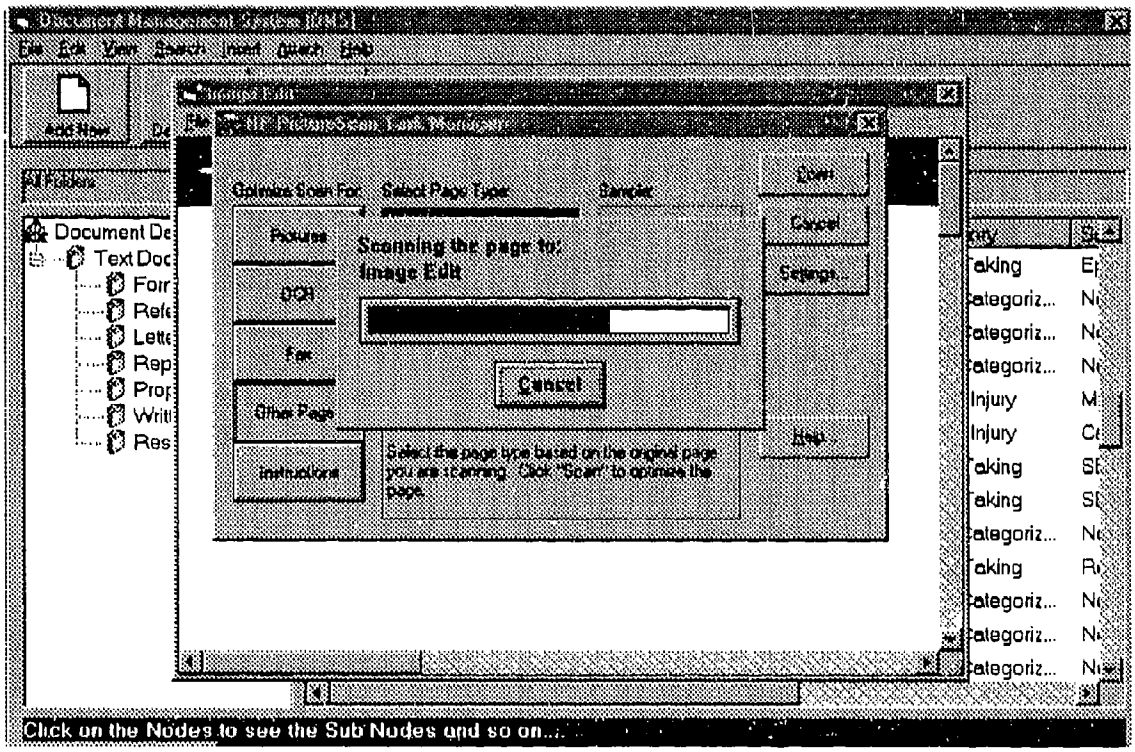
Depending on whether you would like to scan Pictures or documents make your selections below.

Then click on the 'Scan' button to start the scanning process.

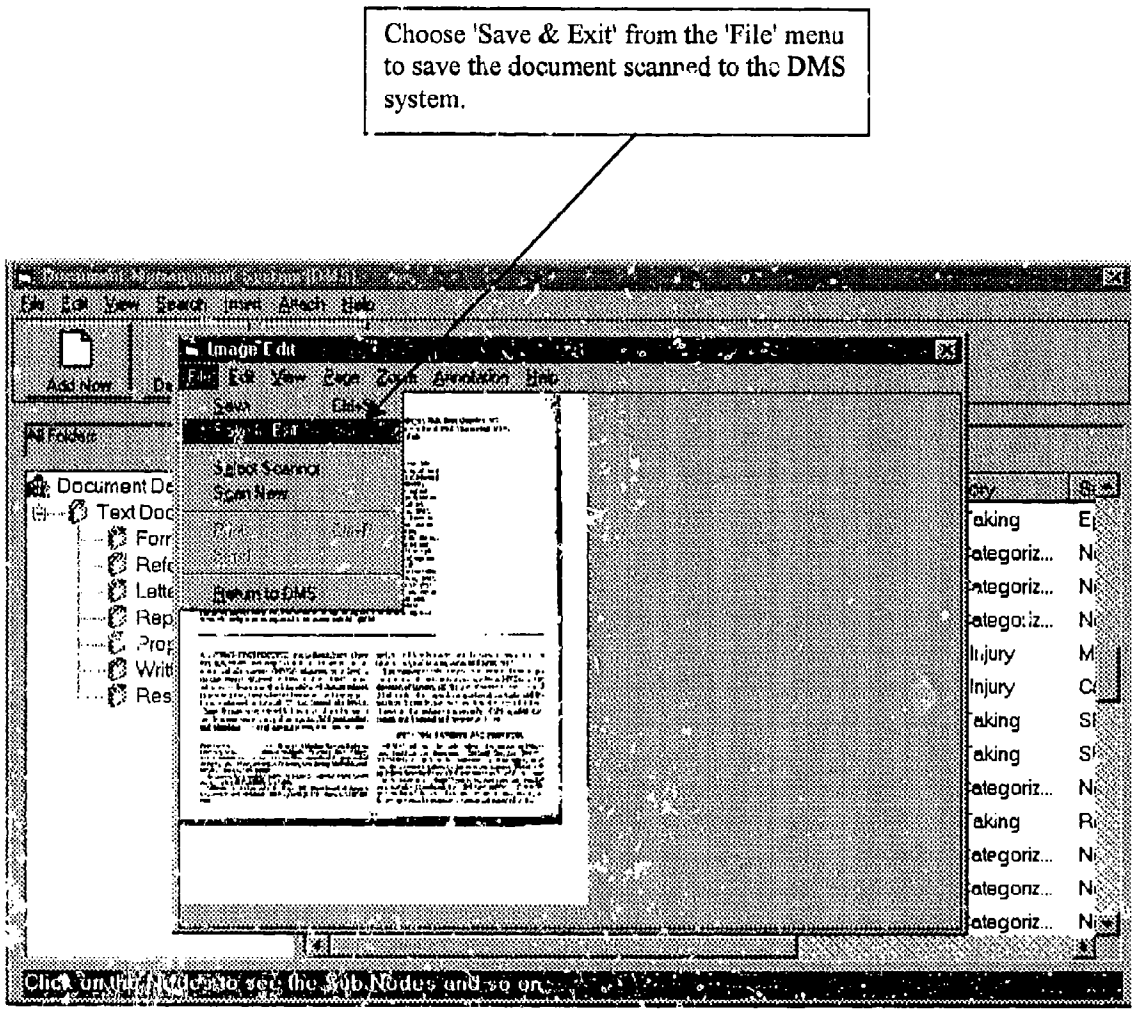


If you are using the HP scanner then place the documents to be scanned on the ADF ie the Automatic document feeder.

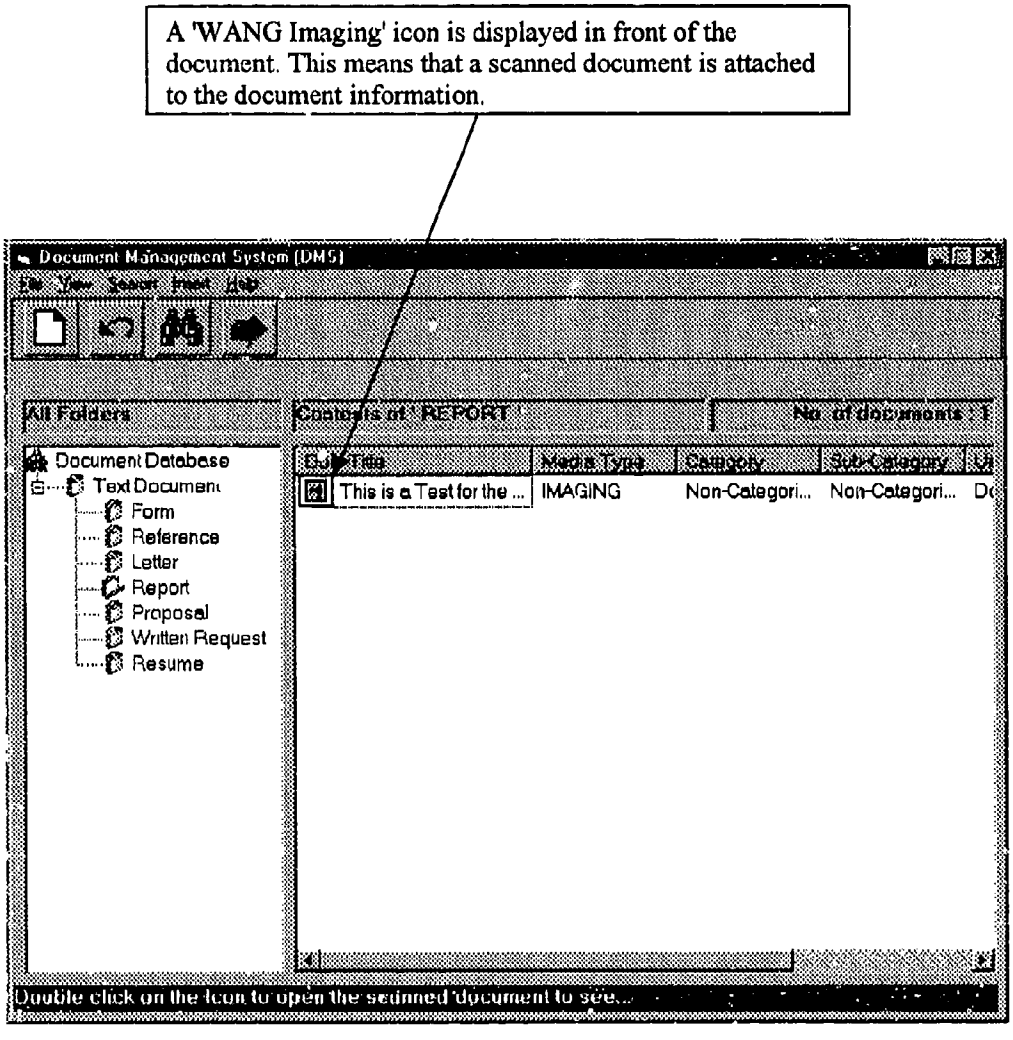
Then ADF automatically scans all the documents in the feeder.



After all the documents in the ADF are scanned, then the documents are displayed on the screen. Then from the 'File' menu choose 'Save & Exit'. This saves the scanned document in the DMS system.

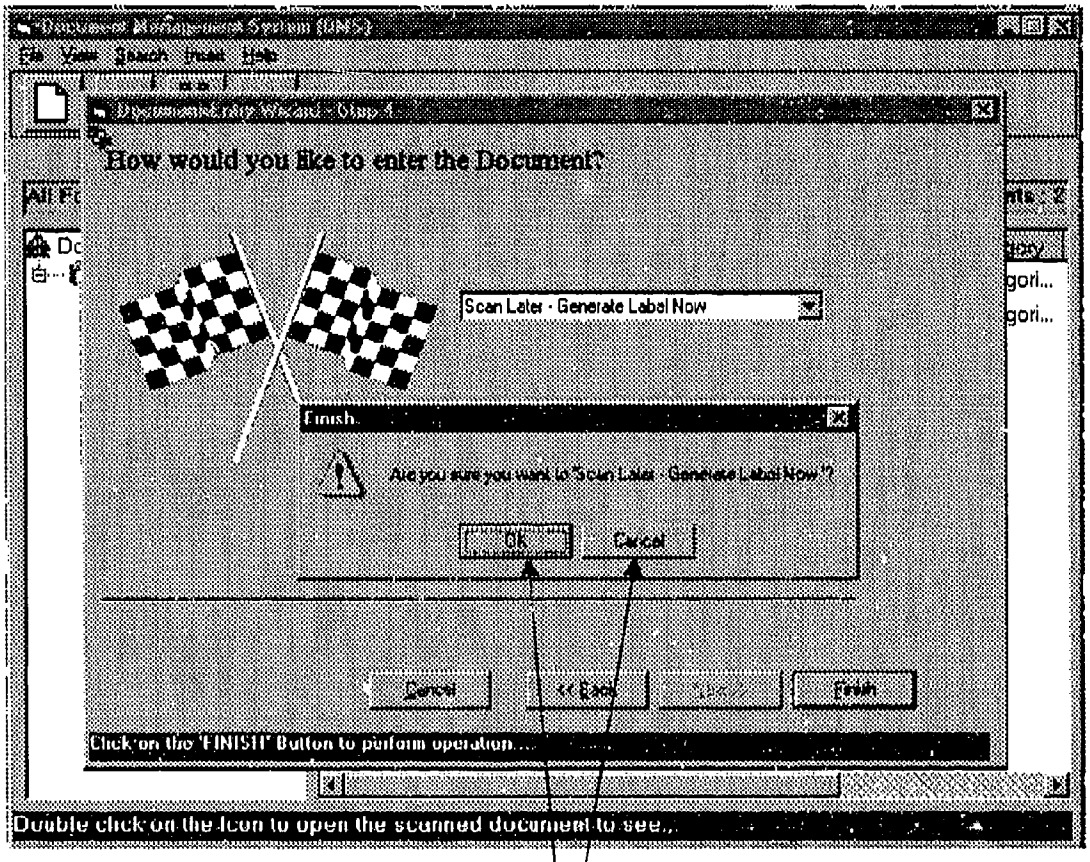


Once you click on the 'Save & Exit' icon on the previous screen, the scanned document gets saved in the DMS system.



2. **Scan Later - Generate Label Now** : Generates a label for you to attach to the document that is yet to be scanned. This option can be selected under the following circumstances.
    - Scanner not available.
    - Delegate scanning job due to lack of time.

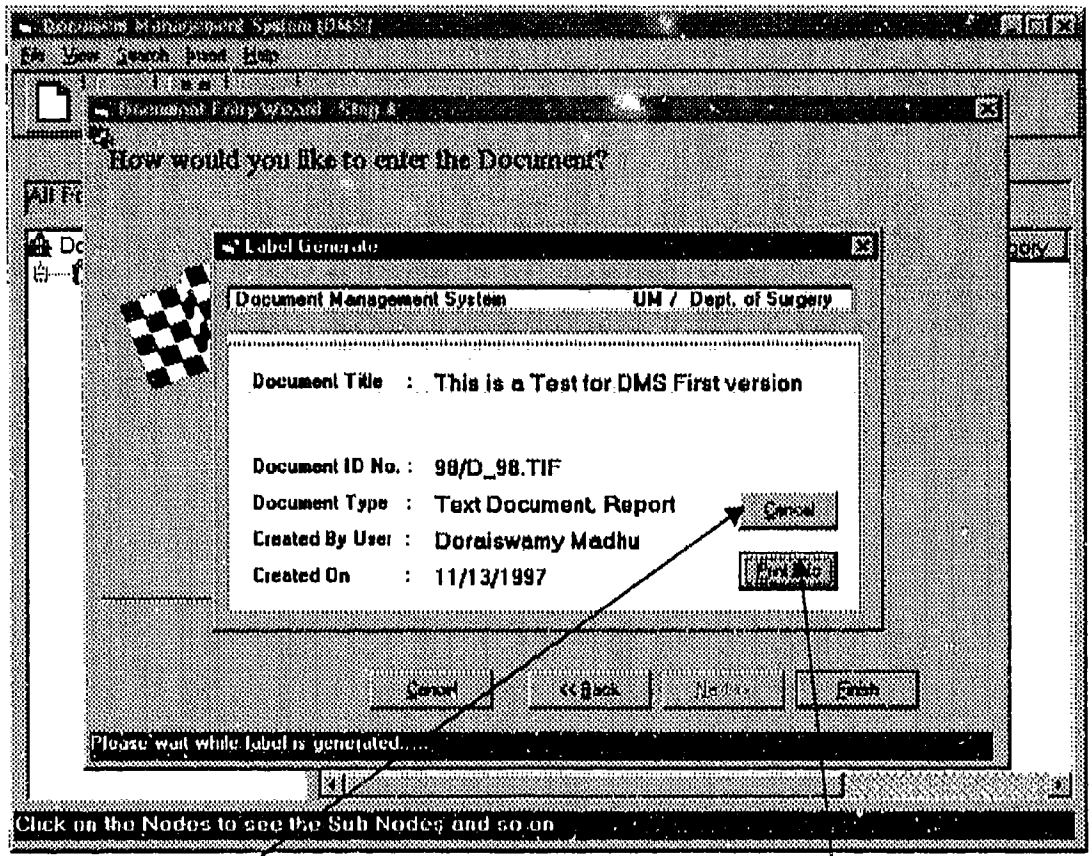
When this option is selected then the following label is generated and pops up on the screen for your viewing. The label generated is shown below :



A message pops up on the screen asking you to verify the action you are going to perform. Click on the 'Ok' button if you would like to continue with the choice made. If you click on the 'Cancel' button then it allows you to make a different choice..

The Label generated is displayed as shown below :

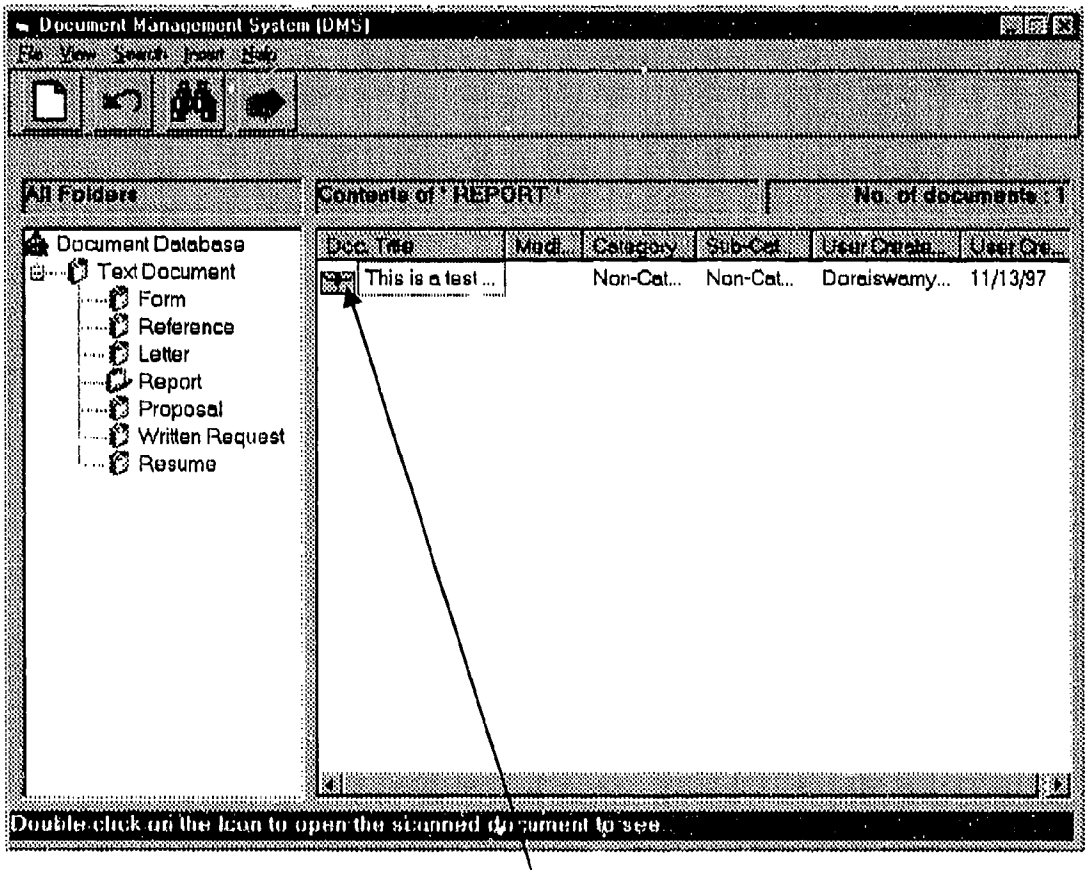
After the Label is generated, print this out and attach it to the document that needs to be scanned. This would help of not mixing up the scanned documents with yet to be scanned ones.



Click on the 'Cancel' button to save the document information that you just entered but does not print the label.

Click on the 'Print Info' button to print the label. Once the label is printed attach it to the document that is yet to be scanned.

After you click on either the 'Print Info' button or the 'Cancel' button on the Label generated then the following screen is displayed.

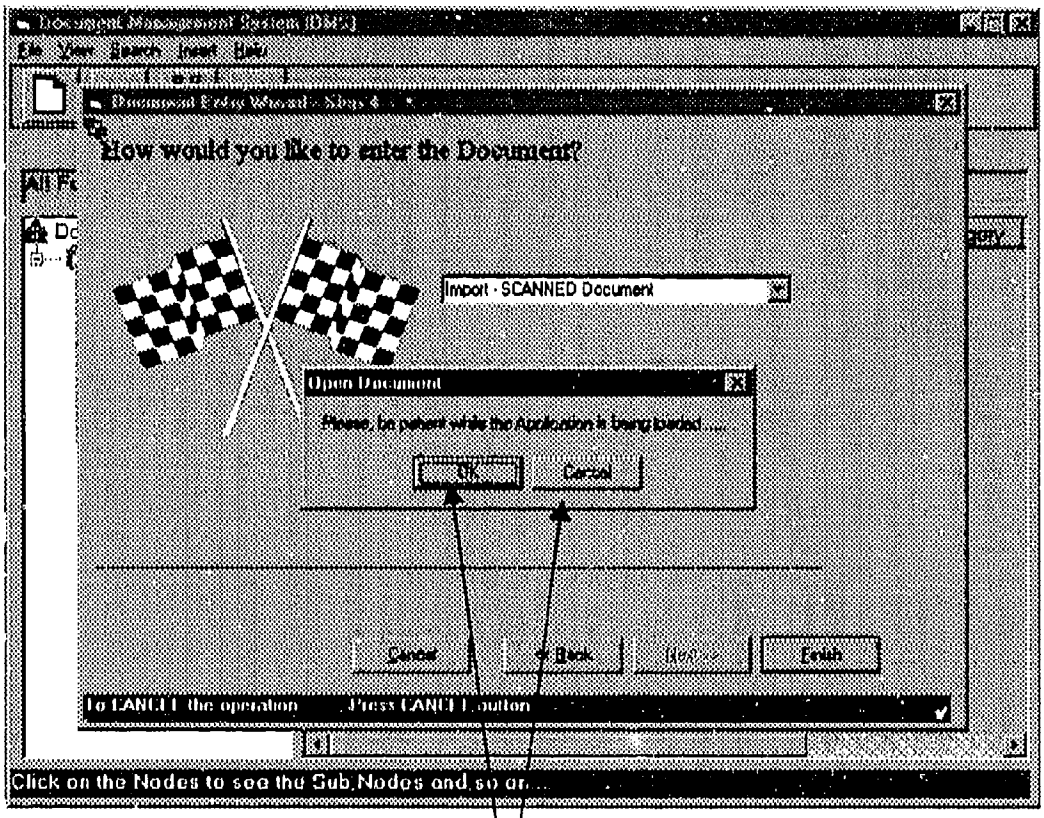


The yellow color 'Envelope' icon appears next to the document you just added to DMS. This icon is a reminder that all the information for the document has been entered but the document itself hasn't been scanned or imported.

P.S : Whenever you see this yellow envelope icon on the screen next to the document , it means that there are certain documents waiting to be scanned.

3. **Import - Scanned Document** : This option allows you to import an already scanned document. Due to lack of time you can ask the person to whom the scanning work has been delegated to go ahead and scan the documents and save them with descriptive file names in a particular folder on the N: drive. Once the documents have been scanned in , then you can go through all the steps of Adding a new document to the DMS system and choose this option.

When this option is chosen the following form pops up on the screen.



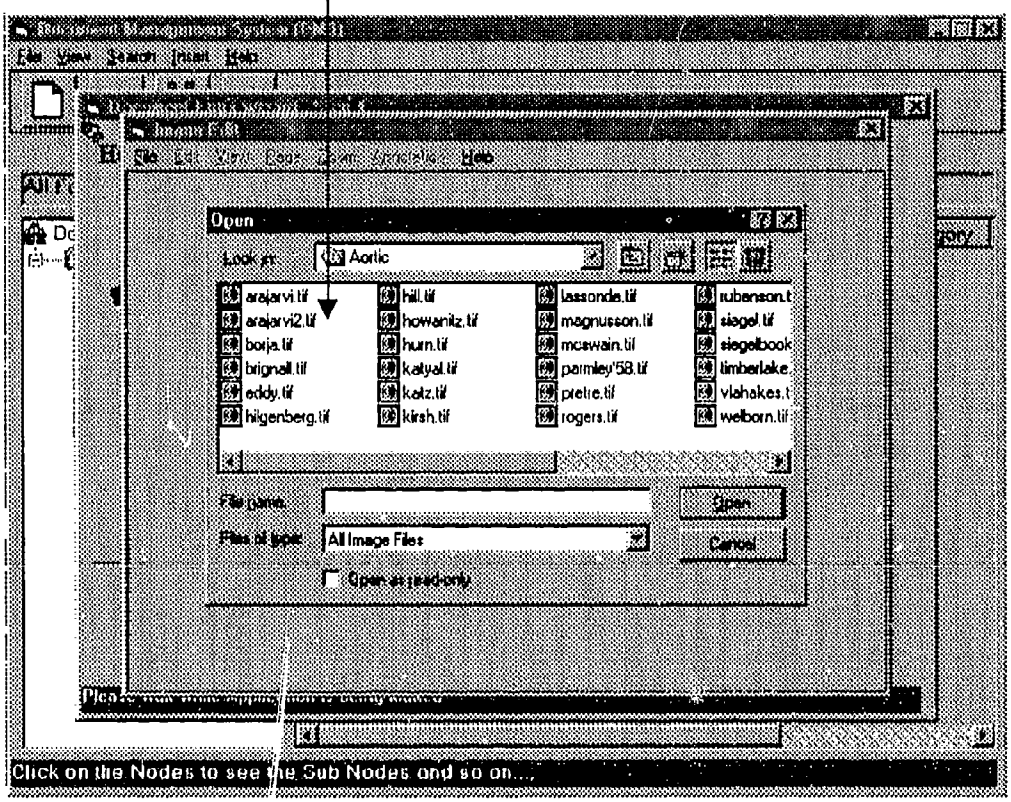
A message pops up on the screen asking you to verify the action you are going to perform. Click on the 'Ok' button if you would like to continue with the choice made. If you click on the 'Cancel' button then it allows you to make a different choice..

When you click on the 'File menu and then choose 'Open' menu item, the following dialog box pops up and the screen looks like in the figure shown below.

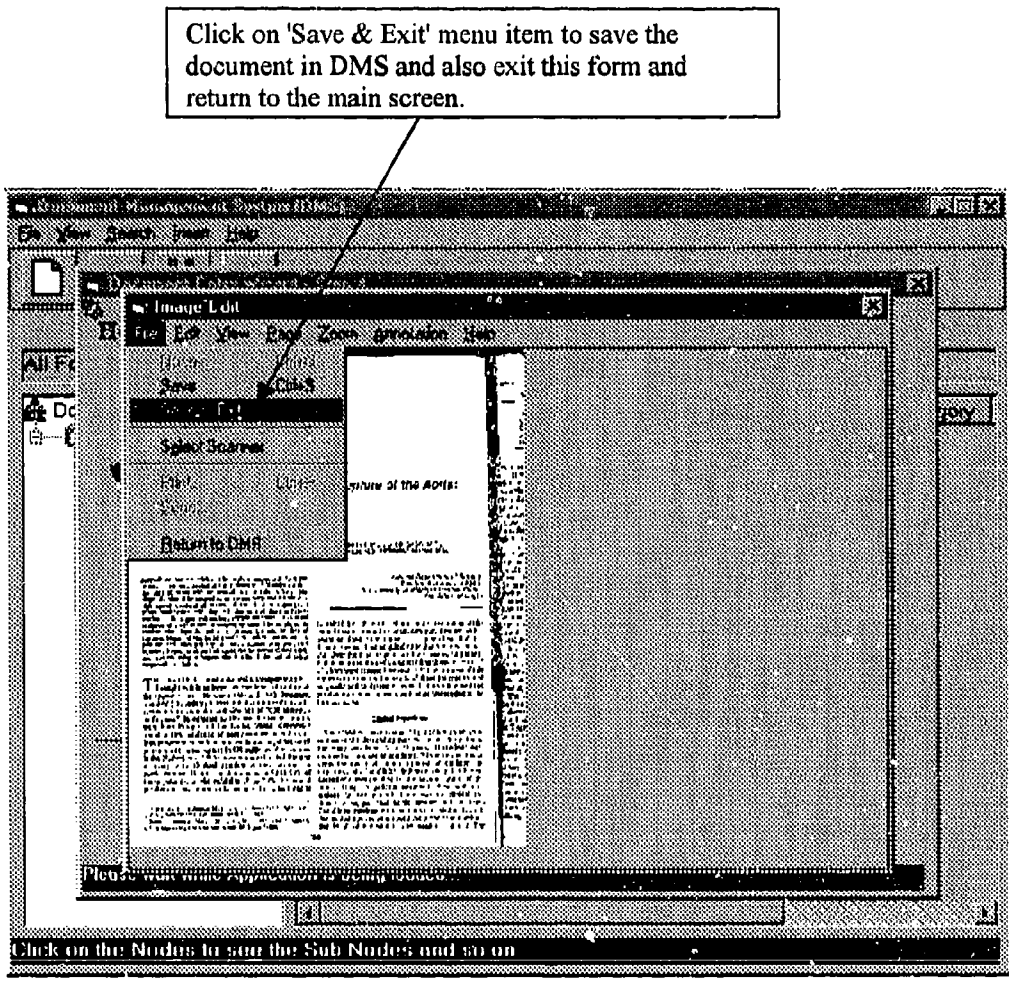
P.S : Please make sure that the person who scans the documents , saves them in a specified directory on the N: drive. Please inform the Tech Support of this directory. So we have all the scanned documents yet to be linked to DMS in one place.

When the Open dialog box pops up, it directly opens the directory specified by you to Tech. Support.

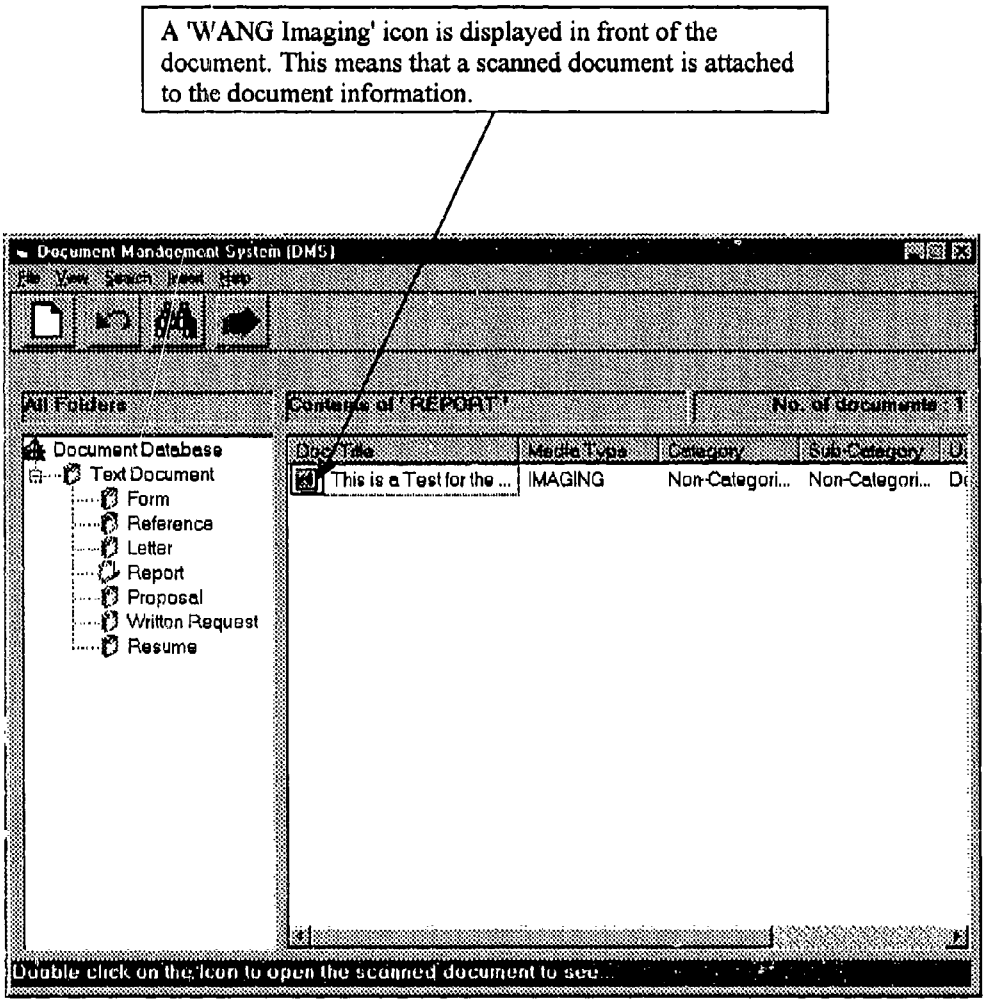
Choose the file you would like to Import. Then click on the 'Open' button on the dialog box. This opens the document for viewing. You can browse through the document and make sure that it is the right document that you would like to import.



After viewing the document, click on the 'File' menu and then click on the 'Save and Exit' menu item if you had chosen the right document.



Once you click on the 'Save & Exit' menu item, the document gets saved and is displayed on the form.



Appendix 8
CD-ROM
(see jewel case)

Appendix 9
Instructions

INSTRUCTIONS

Getting Started:

- Place CD-ROM into CD Player of your computer. From your start menu select **RUN.**
- In the pop-up window **TYPE CD-ROM drive letter, colon, back slash and then Lehman.**

EXAMPLE: D:\Lehman

- Main Menu will appear.

Education Modules

- To view one of the four modules, position the cursor over the module title and then click the left mouse button.
- The module will begin running automatically.

Features of Self-Deliverable Modules

- Narration can be turned on or off during viewing by clicking on the toggle button labeled Narration.
- Text box can be turned on or off during viewing by clicking on the toggle button labeled Text.
- To return to Main Menu to view a different module, click on the button labeled Menu. Then select a new module to view.

Questions, Comments or Additional Information: Elana Perdeck, William Lehman Injury Research Center, P.O. Box 016960 (D-55), Miami, Florida 33101, (305) 585-1190 ext. 1186.

Appendix 10
References

References

1. Webber, William B., Summers, Adam N., Rinehart, Gregory C.: "Computer-Based Multimedia in Plastic Surgery Education." Plastic and Reconstructive Surgery, May 1994. Vol. 93. No. 6. Pg 1290-1300.

2. Eno, Kraig, Sundsten, John W., Brinkley James F.: "A Multimedia Anatomy Browser Incorporating a Knowledge Base and 3D Images." AMIA, Inc., 1992. Pg 727-731.

3. Trelstad, Robert L., Raskova, Jana: "Teaching Pathology Without Lectures Through Computer-Based Exercises, Small-Group Discussions and Reading." AMIA, Inc., 1993. Pg 781-782.

4. Wang, Shengrui, Ayeb, El Bechir, Echave, Vincent, Preiss, Benjamin: "Intelligent Interactive Simulator of Clinical Reasoning in General Surgery." AMIA, Inc., 1994. Pg 419-423.

5. Pincetl, Pierre, Cobbs, Elizabeth. Hbshman, Jim, Liao, Re-Lan, Baranano, M.A., Heller, Rachel, Fry, Emory, Piemme, Thomas: PC CLIN-SIM – A ToolBook Based Clinical Simulation Environment." AMIA, Inc., 1993. Pg 793-794.

6. Webber, William B., Rinehart, Gregory C.: "Computer-Based Multimedia in Plastic Surgery Education." AMIA, Inc., 1993. Pg 829-830.

7. Felciano, Ramon M., Dev, Parvati: "Multimedia Clinical Simulation Based on Patient Records – Authoring, User Interface, Pedagogy." AMIA, Inc., 1994. Pg 59-63.

8. Cobbs, Elizabeth, Pincetl, Pierre, Silverman, Barry, Liao, Ren-Lan, Motta, Camille: "An Interactive Learning Environment for Health Care Professionals." AMIA, Inc., 1994. Pg 49-53.

9. Stevens, Ron, Reber, Elaine: "Maximizing the Utilization and Impact of Medical Educational Software by Designing for Local Area Network (LAN) Implementation." AMIA, Inc., 1994. Pg 781-785.

10. Wyat, Jeremy C., Detmer, William M., Fagan: "Desgin and Evaluation of Multimedia Stimuli to Evoke Clinical Concepts." AMIA, Inc., 1994. Pg 834-838.

11. Chew, F.S., Stiles, R.S.: "Computer Assisted Instruction with Interactive Videodisc Versus Textbook for Teaching Radiology. Academic Radiology, December 1994. Vol. 1:4, Pg 326-331.

12. Criddle, L.M.: "Computer-Assisted Instruction -- A Successful Approach to Mandatory Annual Review Education." Journal of Nursing Staff Development. July 1995. Vol 11:4, Pg 219 `25.

13. Dowd, S.B., Bower, R.: "Computer-based Instruction." Radiology Technology. March 1995. Vol. 66:4, Pg 247-252.

14. MacLeod, M., Costello, G.: "Improving Education Through Computer-based Training." Nursing Management. July 1994. Vol. 25:7, Pg 86.

15. Schmaus, D.: "Evaluating Computer-assisted Instructional Software for the OR." AORN Journal. December 1991. Volu 54:6, Pg 1296-1301.

16. Henry, JB: "Computers in Medical Education – Information and Knowledge Management, Understanding, and Learning." Human Pathology. October 1990. Vol. 21:10, Pg 998-1002.

Appendix 11
Curriculum Vita

June, 1998

CURRICULUM VITAE

Personal

Jeffrey S. Augenstein, M.D., Ph.D., F.A.C.S.
5690 Banyan Drive
Coral Gables, Florida 33156

Home: (305) 667-8897
Office: (305) 585-1190 ext. 1188
Academic Status: Professor of Surgery (June 1, 1996)
Marital Status: Married, Deborah Ann Augenstein
Place of Birth: Miami Beach, Florida
Date of Birth: June 28, 1947

Higher Education

June 2, 1974	M.D., University of Miami School of Medicine Miami, Florida
May 19, 1974	Ph.D., University of Miami Graduate School (Psychology) Coral Gables, Florida
December 19, 1973	M.S., University of Miami Graduate School (Psychology) Coral Gables, Florida (Combined M.D., Ph.D. Program)
1969	B.S. University of Miami (Chemistry) Coral Gables, Florida

Post Doctoral Training

1978-1979	Chief Resident University of Miami Affiliated Hospitals Miami, Florida
1974-1978	Resident in Surgery University of Miami Affiliated Hospitals Miami, Florida

Board Certifications and Licensures

1997	American Board of Surgery, Recertification in Surgery
1996	American Board of Surgery, Added Qualifications in Surgical Critical Care
1991	American Board of Surgery, Recertification in Surgery
1987	American Board of Surgery, Added Qualifications in Surgical Critical Care
1983	Diplomat of the American Board of Surgery

1979	Dade County Florida, Licensure, Medicine
1975	Part III, National Board Medical Examiners
1974	Florida State Licensure, Medicine
1974	Part II, National Board Medical Examiners
1973	Part I, National Board Medical Examiners

Society Memberships and Offices

1997 to present	Society of Laparoendoscopic Surgeons
1996 to present	Surgical Laparoscopic Society
1994 to present	Association for the Advancement of Automotive Medicine (AAAM)
1993 to present	Society for Automotive Engineers, Inc. (SAE)
1991 to Present	American Medical Informatics Association
1991 to Present	Central Florida Council for High Technology
1990 to Present	Electronic Computing Health Oriented (ECHO)
1990 to Present	Eastern Association for the Surgery of Trauma
1990 to Present	Society for Medical Decision Making
1989 to Present	International Society of Surgery
1989 to Present	Surgical Historical Society
1989 to Present	American Trauma Society
1988 to Present	The Pan-American Trauma Society
1988 to Present	the American Association for the Surgery of Trauma (Fellow)
1985 to Present	Jackson Surgical Society
1984 to Present	American College of Surgeons (Fellow)
1982 to Present	American Medical Association
1980 to Present	Society of Critical Care Medicine
1979 to Present	Institute of Electrical and Electronic Engineering (IEEE)
1974 to Present	Sigma XI (Scientific Honorary)
1971 to Present	Society for Psychophysiological Research
1968 to Present	Phi Kappa Phi (Academic Honorary)

Professional Experience

1996 to Present	Professor of Surgery, University of Miami School of Medicine. Miami, Florida
1994 to Present	Director, The William Lehman Injury Research Center, University of Miami at the Ryder Trauma Center, Miami, Florida
1989	Program Director, Trauma Center Building Project, Jackson Memorial Hospital. Miami, Florida
1985 to 1996	Tenured Associate Professor of Surgery and Anesthesiology, University of Miami School of Medicine. Miami, Florida
1984	Associate Professor of Surgery and Anesthesiology, University of Miami School of Medicine. Miami, Florida
1983	Assistant Professor of Biomedical Engineering, University of Miami School of Medi ne. Miami, Florida
1983-1984	Deputy Dean for Clinical Affairs, University of Miami School of Medicine. Miami, Florida
1981-1984	Director of Medical Information Systems University of Miami School of Medicine. Miami, Florida
1981-1984	Associate Dean for Medical Information Systems, University of Miami School of Medicine. Miami, Florida
1980	Health Services Research and Development Program Affiliated Faculty, Veterans Administration Hospital. Gainesville, Florida

Current and Past Teaching Responsibilities

1992	Comprehensive Medical Review Program for Cuban Physicians. University of Miami School of Medicine. March 1992-November 1992.
1990	Comprehensive Medical Review Program for Nicaraguan Physicians. University of Miami School of Medicine. March 1990 - November 1990.
1982	Lecturer, Department of Management Science and Computer Information Systems. University of Miami School of Business Administration. Coral Gables, Florida

1983 to Present	Third and Fourth Year Medical Students, University of Miami School of Medicine. Miami, Florida
	Surgery and Anesthesiology Residents and Fellows, Jackson Memorial Hospital. Miami, Florida
1983 to Present	Surgical Intensive Care Preceptors University of Miami School of Medicine/Jackson Memorial Hospital. Miami, Florida
1982 to Present	Instructor, Advanced Trauma Life Support, (ATLS), American College of Surgeons, Committee on Trauma. Miami, Florida
1981-1984	Supervisor, Rochester Institute of Technology, Co-op Computer Science Students. Rochester, New York
1979 to Present	Lecturer and Clinical Educator for Nursing Staff, Jackson Memorial Hospital. Miami, Florida
1979 to Present	Supervisor, Dade County Community Laboratory, Research Students. Miami, Florida

Thesis and Dissertation Advising

University of Miami, School of Nursing.
Coral Gables, Florida
University of Miami, Department of Biomedical Engineering.
Coral Gables, Florida

Grants and Contracts

1997	American Automobile Manufacturers Association: "Injury Patterns in Side Impact Crashes."
1996	U.S., Department of Defense. "Training Military Surgeons in a Civilian Trauma Center."
1996	American Automobile Manufacturers Association. "Side Impact Study."
1995 to Present	General Motors Corporation. Design of an Information System for the Center of Motor Sports Crashes."
1995 to Present	Pilot Research Program of the Miami Center on Human Factors and Aging Research. "Hazard Injury Patterns in Elderly Persons."

1991 to Present	U.S. Department of Transportation -National Highway Traffic Safety Administration. "The Development of an Automobile Trauma Care and Research Facility at the Jackson Memorial Hospital" (JMH).
1989 to 1992	International Business Machines Incorporated. "Development of a Distributed Intelligence Clinical Information System."
1989	State of Florida Department of Health and Rehabilitative Services, Emergency Medical Services Division. "Computerized Trauma Registry for the State of Florida."
1987	W.K. Kellogg Foundation. "Dissemination of a Multi-Disciplinary, Multi-Faceted Approach to Efficient Critical Care."
1985	W.K. Kellogg Foundation. "Cost Containment in Health Care."
1980	Edyth Busch Foundation. "Development of Computers: Surgical Intensive Care Unit."
1979	University of Miami Biomedical Research Support Grant "Surgical Intensive Care Data Management."

Departmental Administrative and Committee Responsibilities

1997	Member, Task Force on Compliance with Medicare and Other Payor Billing Requirements. University of Miami, School of Medicine. Miami, Florida
1997	Chief, Team "A" Division of Trauma, Department of Surgery. University of Miami, School of Medicine. Miami, Florida
1994-1995	Chief, Team "A" Division of Trauma, Department of Surgery. University of Miami, School of Medicine. Miami,Florida
1979 to 1985	Co-Director, Surgical Intensive Care Unit, Jackson Memorial Hospital. Miami, Florida
1979-1982	Supervisor, Department of Surgery Professional Billing System niversity of Miami School of Medicine. Miami Florida

Extra-Departmental Administrative and Committee Respon ibilities

1997	Chairman, Health Information Management Committee. Jackson Memorial Hospital. Miami, FL

1997 - 2000	Member, Injury Research Grant Committee of the Centers for Disease Control and Prevention (CDC). The Secretary of Health and Human Services. Washington, DC
1997	Physician Coordinator, U.S., National Highway Traffic Safety Administration, Crash Injury Research & Engineering Network (CIREN) Project (Hospital-based research)
1996	Member, Dean's Medical School Information Technologies Advisory Committee. University of Miami School of Medicine. Miami, Florida
1996	Board of Directors, Association for the Advancement of Automotive Medicine. Des Plaines, Illinois.
1995 to Present	Member, Admissions Committee, School Council. University of Miami, School of Medicine. Miami, Florida
1995	Review Board, Participation of Research Proposals Review for Centers of Disease Control. Atlanta, Georgia
1995	Member, Request for Proposal Review Committee (RFP), Medical Group Office, University of Miami School of Medicine, Miami, Florida
1994	Chairman, Neurotrauma Task Force Review Committee, Department of Neurosurgery, University of Miami School of Medicine. Miami, Florida
1994 to 1997	Co-Chairman, Health Information Management Committee, Medical Records, Jackson Memorial Hospital. Miami, Florida
1994	Member, Teleradiology Oversight Committee, Office for Research and Graduate Studies, University of Miami School of Medicine, Miami, Florida
1993	Member, Education Committee, Department of Surgery, University of Miami School of Medicine, Miami, Florida
1993 to Present	Member, Clinical Computer Coordinating Committee, Medical Records, Jackson Memorial Hospital. Miami, Florida
1992 to Present	Chairman, Interdisciplinary Quality Management Council Committee, University of Miami School of Medicine/Jackson Memorial Hospital - Ryder Trauma Center. Miami, Florida
1991 to Present	Board Member, Jackson Memorial Foundation, Jackson Memorial Hospital. Miami, Florida
1991 to Present	Member, Trauma Committee, Jackson Memorial Hospital. Miami, Florida

1991-1992	Member, Health Care Contracts Committee, Jackson Memorial Hospital. Miami, Florida
1990	Member, EMS Trauma Network Data Committee. Miami, Florida
1990-1991	Member, Search Committee for ChairmanCollege of Engineering/University of Miami. Miami, Florida
1989-1991	Member, Faculty Senate, University of Miami. Miami, Florida
1986	Member, Society of Critical Care Medicine Task Force on Cost Containment
1985	Member, Treatment Policy Task Force, Jackson Memorial Hospital. Miami, Florida
1985	Member, Seif-Study Committee Development, School of Medicine. Miami Florida
1985 to Present	Member, Medical Records Committee Jackson Memorial Hospital. Miami, Florida
1984	Chairman, Session 2, Sixth Annual International Symposium of Computers in Critical Care and Pulmonary Medicine. Heidelberg, Germany
1983	Member, Pharmacy Computer Selection Committee, Jackson Memorial Hospital. Miami, Florida
1983	Member, ICU Action Team, University of Miami School of Medicine. Miami, Florida
1983	Member, UMHC Facility Planning Committe, University of Miami School of Medicine. Miami, Florida
1983	Chairman, Systems Development Committee, University of Miami School of Medicine. Miami, Florida
1983	Member, Health Care-A-Van Steering Committee, University of Miami School of Medicine. Miami, Florida
1983	Member, Computer Policy Committee University of Miami. Miami, Florida
1983 to 1993	Member, Computer Advisory Committee, Jackson Memorial Hospital. Miami, Florida
1983-1984	Member, Management Group Committee, University of Miami School of Medicine. Miami, Florida
1983-1984	Member, I.C.U. Committee, University of Miami/Jackson Memorial Hospital. Miami, Florida

1983-1984	Member, Advisory Committee of the In Vitro Fertilization and Embryo Transfer Program, Department of Obstetrics and Gynecology, University of Miami School of Medicine. Miami, Florida
1982-1984	Member, D.R.G. Coordinating Committee, Jackson Memorial Hospital. Miami, Florida
1982-1984	Member, Patient Care System Selection Committee, Jackson Memorial Hospital. Miami, Florida
1982-1984	Member, Computer Technical Review Committee, University of Miami School of Medicine. Miami, Florida
1982-1984	Member, Executive Advisory Committee of the Faculty, University of Miami School of Medicine. Miami, Florida
1982-1984	Member, Committee for Latin American Affairs, University of Miami School of Medicine/Jackson Memorial Hospital.Miami, Florida
1982-1984	Chairman, Telecommunications Committee, Jackson Memorial Hospital. Miami, Florida
1981-1984	Member, Medicare Committee, University of Miami School of Medicine. Miami, Florida
1981-1984	Member, Data Base Committee for Hospital Information Systems, Jackson Memorial Hospital. Miami, Florida
1981-1984	Director, Medicine Professional Income Plan Centralized Billing System, University of Miami School of Medicine. Miami, Florida
1981-1984	Chairman, Committee on Information Systems, University of Miami School of Medicine. Miami, Florida
1981 to Present	Director, Plenary Session on Data Processing Third World Congress of Critical Care. Washington, DC
1981	Member, Anti-Bureaucracy Committee, Jackson Memorial Hospital. Miami, Florida
1980-1981	Chairman, Society of Critical Care Data Base Committee
1980-1984	Member, Patient Care System Steering Committee, Jackson Memorial Hospital. Miami, Florida
1980	Member, Delphi Project, NIH Program to Evaluate Intensive Illness in Critical Care.
1980 to 1985	Member, Steering Committee, Computers in Critical Care and Pulmonary Medicine

1979 to Present	Member, American College of Surgeons Committee on Trauma
1978 to Present	Judge, Dade County Science Fair. Miami, Florida
1976-1984	Investigator, Environmental Protection Agency Project "Protracted Noise Exposure and Cardiovascular Function"
1974 to Present	Director, Medical Computer Systems Laboratory, University of Miami School of Medicine. Miami, Florida

Invited Congressional Testimonies

1996	Invited Testimony to the House Committee on Appropriations, Subcommittee on Transportation and Related Agencies, "Witness for Airbag Hearing." Washington, DC. December 19th
1996	Invited Testimony to the House Committee on Appropriations, Subcommittee on Transportation, "Significance of Hospital-Based Automobile Crash Research." Washington, DC. February 28
1995	Invited Testimony to the House Committee on Appropriations, Subcommittee on Transportation, "Significance of Hospital-Based Automobile Crash Research." Washington, DC. March 21st.
1995	Invited Testimony to the House Committee on Appropriations, Subcommittee on Labor, Health and Human Services. Significance of Injury Control and Prevention Research. Washington, DC. February 3rd.
1995	Invited Speaker for the National HighwayTraffic Safety Administration: "Jackson Memorial Hospital/William Lehman Injury Research Center - Injuries to Restrained Occupants in Frontal Crashes." Washington, DC. January 23rd.
1994	Invited Testimony to the House Committee on Appropriations, Subcommittee on Transportation. "Significance of Hospital-Based Automobile Crash Research: An Update" Washington, DC. April 27th.
1993	Invited Testimony to the House Committee on Appropriations, Subcommittee on Transportation. "Significance of Hospital-Based Automobile Crash Research." Washington, DC. May 6th.

Product Liability Expert Witness

1996	Susuki Motor Company

Invited Lectureships

1998	Presenter – International Technical Conference of the Enhanced Safety of Vehicles: "Injury Patterns Among Air Bag Equipped Vehicles." Windsor, Canada June 3rd.

1998	Presenter – 1998 Miami "Trauma Symposium: Epidimiology and Prevention of Injury."Fountainebleau Hotel. Miami Beach, FL. March 13th.
1998	Speaker – Legal Advocates Seminar: "Motor Vehicle Crash Analysis."Sheraton Bal Harbor. Miami Beach, FL. January 30th.
1997	SICU Infections Course: "Neurological Infections." University of Miami, Division of Trauma and Surgical Critical Care. Miami, FL. December 17th.
1997	Society of Automotive Engineering Performance TOPTEC: "Chest Injury Patterns Among Drivers Protected by Airbags." Costa Mesa, CA. August 5th.
1997	Broward General Medical Center: "Crash Research Presentation" Ft. Lauderdale, FL. July 7th.
1997	American Automobile Manufacturers Association: "Side Impact Analysis." Dearborne, MI. June 17th.
1997	Visiting Professor - Methodist Hospital of Indiana: "Injury Patterns with Car Restraint Systems." Indianapolis, IN. April 9th.
1997	National Transportation Safety Board - Air Bags and Child Passenger Safety: Panel 2: Air Bag-Induced Injuries – Who's Vulnerable and How Do We Know It? Washington, DC. March 17th.
1997	SAE International: "Heart Injuries Among Restrained Occupants in Frontal Crashes." Detroit, MI. February 25th.
1997	Discussant: "Trauma Registry Injury Coding in Superfluous - A Comparison of Outcome Prediction Based Upon Trauma Registry and Hospital Information System ICD-9 Codes." Sanibel, FL. January 15th
1997	Fourth Annual Trauma Symposium: "Mechanism of Injury in an Automobile Crash: How Safe are you Really in your Automobile?" Fort Lauderdale, FL. February 13th.
1996	Medical School 101: "Trauma and Triumph." University of Miami School of Medicine. October 31st.
1996	The Brain Injury Case: What The Trial Lawyer Needs to Know. "Biomechanics of Auto Crash Related Neurotrauma."
1997	September 20th.
1996	"Cutting Edge in Critical Care." Jackson Memorial Hospital, Department of Nursing Education. Miami, Fl. September 19th.

1996	Automotive Occupant Restraints Council, Annual General Meeting – Second Technical Session Speaker. Orlando, Fl. March 14th.
1996	Traumatic Brain Injury 1996 - The Miami Experience: "The Biomechanics of Automobile Crash-Related Neurotrauma." University of Miami Division of Continuing Medical Education. February 3rd.
1995	International Conference on Pelvic and Lower Extremity Injuries: "Data Collection System for Clinical and Trauma Research." Washington, DC. December 6th.
1995	Florida Symposium on Highway Safety: "The William Lehman Injury Research Center: Its Mission and Scientific Findings Related to Airbags and Safety Belts." Tampa, FL December 1st.
1995	Speaker at the Ft. Lauderdale Surgical Society: Mechanics of Car Crash Injuries." Ft. Lauderdale, FL November 16th.
1995	Surgical Grand Rounds: "Computers in Surgery." University of Miami School of Medicine. Miami, FL. October 12th.
1995	Neurotrauma to Neurorehabilitation: "A Continuem of Care" - Case Management. Trauma/Neurosurgery/Rehabilitation. University of Miami/Jackson Memorial Hospital. Miami, FL. October 6th.
1995	Broward General Medical Center Trauma Service. , creation of a Crash Scene." Ft. Lauderdale, FL. October 2nd.
1995	Briefing: The William Lehman Injury Research Center's Research on Injuries to Restrained Occupants in Frontal Crashes." Washington, DC. September 15th.
1996	"Progress of the William Lehman Injury Research Center." Briefing to the staff of the Centers for Disease Control and Prevention. Atlanta, GA. July 20th.
1995	Injury Severity Scaling/Scoring Briefing Conference. Annapolis, MD. July 12th.
1995	"Computerized Data Collection Methods for Crash Research" Briefing to General Motors Safety Staff. Detroit, MI. June 21st.
1995	"Biomechanics." Lynn University, Orthopaedics Group. Miami, Fl. May 10th.
1995	SAE 1995 Government/Industry Meeting Crashworthiness Research Topics. "Airbag Crash Field Study Findings." Washington, DC. April 11th.

1995	American Automobile Manufacturers Association Briefing. "Techniques for Hospital-based Automobile Crash Analysis." Detroit, MI. March 14th.
1995	"Chest and Abdominal Injuries Suffered by Restrained Occupants." Society of Automotive Engineering, Inc. Annual Congress and Exposition. Detroit, MI. March 1st.
1995	White House Conference on Aging. "Keys to Enhancing Older Person Mobility." TRB White House Mini-Conference on Transportation." Issue Category: Traveler Safety. Washington, DC. January 23rd.
1995	Computer System and "Crash Study Case Presentation." U.S., Department of Transportation, Office of Crashworthiness Research. Washington, DC. January 22nd.
1995	Level I Trauma Multidisciplinary Meeting, "Presentation of Crash Study Methodology and Case Review." Hollywood Memorial Hospital. Hollywood, FL. Jan 7th.
1994	International Symposium on Head Injury Research. "A Systematic Approach to Mild Traumatic Brain Injury in a Trauma Center." Washington, DC. Oct. 12th.
1994	Orthopedics and Rehabilitation Grand Rounds, "New Patterns of Injuries Sustained by Restrained Occupants in Frontal Crashes." University of Miami School of Medicine. Miami,FL. Sept. 22nd.
1994	American College of Emergency Physicians, Educational Satellite Symposium. "Improving the Care of Car Crash Occupants: Detecting Occult Injuries in Air Bag Crashes and Creating EMS Crash Study Teams to Work Smarter, Faster and Save Lives." Orlando, FL. Sept. 12-13.
1994	"Crash Study" Case Presentation. U.S., Department of Transportation/ National Highway Traffic Safety Administration. Washington, DC. June 22nd-24th.
1994	"Crash Study" Case Presentation. U.S., Department of Transportation/ National Highway Traffic Safety Administration. Washington, DC. March 17-18th.
1994	North Broward Medical Center Trauma Service - "Recreation of a Crash Scene." Pompano Beach, FL. March 10th
1994	"Airbag Protected Crash Victims – The Challenge of Identifying Occult Injuries." Society of Automotive Engineers, Inc. Annual Congress and Exposition. Detroit, MI. March 2nd.
1994	Surgical Grand Rounds, "New Patterns of Injuries Sustained by Restrained Occupants in Frontal Crashes." University of Miami School of Medicine. Miami, Fl. February 24th.

1994	"William Lehman Research Center." University of Miami School of Medicine, Board of Overseers. Miami, FL February 23rd.
1993	Medical Records Presentation. "Challenges of Information Management in Trauma Care." Jackson Memorial Hospital. Miami, Fl. November 5th.
1993	"Crash Study" Case Presentation. U.S., Department of Transportation/National Highway Traffic Safety Administration. Washington, DC. October 19th-20th.
1993	"Biomechanics." Lynn University, Orthopaedics Group. Miami, Fl. October 15th.
1993	SIGDOC Conference. "Document Control: Who's Got What Today?" Waterloo, Canada. October 5th-8th.
1993	Broward General Medical Center Trauma Service - "Review of Automobile Crash Research." Ft. Lauderdale, FL. Sept. 20th.
1993	"Crash Study" Case Presentation. U.S., Department of Transportation/National Highway Traffic Safety Administration. Washington, DC. June 29th-30th.
1993	The Second World Conference on Injury Control. "Injury Studies of Frontal Automobile Crashes with Restrained Occupants." Atlanta, GA. May 21st.
1993	Speaker: "Introduction to Automobile Injury Research from Crash Through Rehabilitation and Common Injuries that Can Occur in an Automobile Crash." Ryder Trauma Center. Miami, FL. April 8th.
1993	Crash Case Presentation: "Lower Extremity Injuries Resulting from Vehicular Crashes" - Symposium. Maryland Institute for Emergency Medical Services. Baltimore, MD. March 30th-31st.
1993	"Crash Study" Case Presentation -Intrusion Injury Workshop. Federal Highway/National Highway Traffic Safet Administration - Crash Analysis Center. George Washington University, Virginia Campus, VA. February 18th.
1993	"Crash Study" Case Presentation. U.S., Department of Transportation/National Highway Traffic Safety Administration. Washington, DC. February 16th-17th.
1993	Eastern Association for the Surgery of Trauma. "Injury Patterns Associated with Direction of Impact: Drivers Admitted to a Level I Trauma Center (Discussant). Longboat Key, FL. January 13th.
1992	"Crash Study" Case Presentation. U.S., Department of Transportation/National Highway Traffic Safety Administration - Crash Analysis Center. George Washington University, Virginia Campus, VA. November 9-10.

1992	Trauma and Critical Care '92 Point/Counterpoint XI. "Computers in the ICU." Atlantic City, NJ. May 4th.
1992	"Computerized Record Keeping in the Intensive Care Unit." Third Critical Care Symposium: The Management of Critical Illness - Therapeutic and Technologic Advances. Asheville, NC. March 28th.
1991	American College of Surgeons. "Practical Aspects of Trauma Care: Urban and Rural Settings." Chicago, IL. October 24th.
1991	Premier Hospital Alliance Panel. "Trends in Critical Care Monitoring and Intervention Technologies." Stuart Island, FL. March 13th.
1990	Guest Speaker for the Ron King Show on WLYF-FM 101.5. "Trauma Center." Miami, FL. July 31st.
1990	Masters in Trauma/Critical Care 1990. "Managing Critical Care Resources." Washington, DC. June 9th.
1990	Innovations '90. "A Wireless, Fully Mobile, Medical Charting Workstation System." West Palm Beach, FL. April 5th.
1990	Trauma Symposium II. "The Future: Using Information for Trauma Research. Miami Beach, FL. March 29th.
1990	10th Annual Conference on Computers in Critical Care and Fifth Annual Meeting o the Society for Clinical Data Management Systems: Clinical Information Systems for the 90's. "Experiences with a Computerized Information Management System." Orlando, FL. February 13th.
1990	University of Miami Student Council Convention: "Computers in Medicine - New Systems in Hospital." Miami, FL. February 8th.
1989	Jackson Memorial Hospital – Hospital Informations Systems. "Automation: Physician's Perspective." Miami, FL. September 28th.
1989	10th Annual International Symposium on Computers in Critical Care Pulmonary Medicine and Anesthesia- "Experiences in Surgical Care Computing." Stamford, CT. September 20th.
1989	Norwalk Hospital, Surgical Trauma and Critical Care Staff - "The New Developments in Computer Database Management in the Critical Care Unit." Norwalk, CT. Sept. 19th.
1989	Jackson Memorial Hospital - Personnel - "Dade-County Schools Vocational Week." Miami, Fl. August 2nd.
1989	Electronic Computing Health Oriented (ECHO) - Spring Meeting. "Clinical Decision Support: The Clinician's View." Monterey, CA. April 2nd.

1989	University of Miami School of Medicine, Trauma Symposium. "Trauma During Pregnancy." Miami, FL. March 30th.
1989	School of Nursing Jackson Memorial - "ICU Current Concepts in Surgical Critical Care. Computerization in ICU's." Miami, FL. January. 27th.
1987	Florida Society of Critical Care Medicine - 5th Annual Labor Weekend Symposium. "Critical Care Medicine: Is it Cost Effective?" Marco Island, FL. September 4th.
1987	Institute of Medical Record Economics, Inc. - 3rd Annual International Conference on Computerization of Medical Records. "Developing, Testing, and Using a Computerized Medical Record System." Chicago, IL. March 26th.
1987	University of Miami – Industrial Engineering Seminar. "Building Clinical Information Systems." Coral Gables, FL. February 11th.
1986	The Brookings Institution, "Rationing of Medical Care for the Critically Ill." Washington, DC. May 27th.
1986	Orlando Regional Medical Center, Critical Care Medicine 1986 Conference, Continuing Education "Computers in ICU." Orlando, FL. April 2nd.
1985	The Oregon Health Sciences University, Department of Anesthesiology, Society of Critical Care Medicine Symposium. "Economics of Critical Care." Portland, OR, November 14th.
1985	Florida Medical Records Association, "Utilizing Computers to Create Medical Records." Miami, FL. June 4th.
1985	Society of Critical Care Medicine, Plenary Session, "Economic Issues; Critical Care Medicine in the 80's." Chicago, IL. May 21st.
1985	The 26th Annual Spring Convention of the Florida Language, Speech and Hearing Association (F.L.A.S.H.A.). "DRG's Got You Running Scared?" Miami Beach, FL. May 5th.
1985	Community Laboratory Research Program, Dade County School System, "Future Careers in Medicine." Miami, FL. March 22nd and 26th.
1984	Surgical Grand Rounds, "Academic Clinical Practice in an Era of Cost Containment," University of Rochester, Department of Surgery, Rochester, NY. June 16th.
1984	Professional Seminars - Winter Conference on Principles of Practice Management. "Using a Computer in the Office." Vail, CO. February 25th.

1983	2nd Annual Continuing Medical Education Symposium University of Miami School of Medicine Lecture, "Utilization of Computer Assisted Instruction and Video Tapes in the SICU," Miami, FL.
1983	69th Clinical Congress of the American College of Surgeons. "System Orientation for Total Patient Management." "Technology Now and to Come." Atlanta, GA. October 16th-21st.
1983	II Panamerican-Iberic Congress of Intensive and Critical Care Medicine. "Computers in Intensive Care." Buenos Aires, Argentina. September 18th.
1983	Xerox Corporation. "Application of Xerox Star Work Station in Medical Information Management." Los Angeles and San Francisco, CA. July 26, 27th.
1983	Symposium on Continuing Medical Education. University of Miami School of Medicine. "Utilization of Computer-Assisted Instruction and Videotapes in the Surgical Intensive Care Unit." Miami Beach, FL. July 1st.
1983	Alumni Association Conference on Surgical Education, University of Miami School of Medicine. "Hospital ComputerSystems - What They Provide Now and Their Future." Miami, FL. June 18th.
1983	Seminar Conferences on Practice Management: Managing a Medical Practice in an Economic Recession. "How Technology Will Affect The Style of Medical Practices in the 80's." "Application and Limitation of Computer Technology in the Practice of Medicine." "Guidelines for Defining Your Requirements." "Integration of Human Resources and Computer Resources.""Maximizing the Accounts Receivable." Orlando, FL. June 8th-12th.
1983	The Vail Symposium in Intensive Care Ninth Annual Vail Conference in Anesthesiology. The Winter Conference on Principles of Practice Management. "Medical Office Computer Applications." Vail, CO. January 29th.
1982	Critical Care Symposium. Boston University School of Medicine, Division of Surgery, "Computers in Critical Care: We Have The Answers; Do We Know The Questions?" Boston, MA. September 24th.
1982	Third Annual Meeting of Hewlett-Packard Patient Data Management Systems (PDMS): User's Group. "Challenges for Intensive Care Information Management Systems." Atlanta, GA. September 16th.
1982	Third Annual PDMS User's Group Meeting. Presidential Speaker, "A Non-PDMS User's View of ICU Data Management." Atlanta, GA. September 16th.

1982	National Computer Conference. "Administrative Decision Support Systems in Medicine." Houston, TX. June 7th.
1982	Fourth Annual International Symposium. Computers in Critical Care and Pulmonary Medicine. "Clinical Experience with a Surgical Intensive Care Data Management System." London, England. June 2nd.
1981	VII Reunión Nacional de Medicina Crítica y Terapia Intensiva. Asociación Mexicana de Medicina Crítica y Terapia Intensiva. Curso de Actualización Profesional en Medicina Crítica: "Development of Intensive Care Systems, Organization of SICU" and "Hemodynamics of High Risk Surgical Patients." Mexico City, Mexico. November 23rd.
1981	Pediatric Orthopaedic Society, Presidential Speaker. "Computers in Pediatric Orthopaedics." Marco Island, FL and Palm Beach, FL. November 11th.
1981	34th Annual Conference on Engineering in Medicine and Biology. "Intensive Care Automation." Houston, TX. September 21st.
1981	Critical Care Seminar, Intervention for the Critically Ill Patient. "Hemodynamic Calculations in Acutely Ill Patients." Brookwood Medical Center, Birmingham, AL. July 20th.
1981	American College of Surgeons, Trauma Course. "ICU Monitoring." Orlando, FL. June 25th.
1981	Third Annual International Symposium. Computers in Critical Care and Pulmonary Medicine. "What Problems are Appropriate to Computer Solutions in the ICU?" Norwal, CT. June 17th.
1981	Third World Congress on Intensive and Critical Care Medicine in Association with the 10th Annual Scientific and Educational Symposium of the Society of Critical Care Medicine. "Logic Data Analysis, Decision Making, Prognosis." Washington, DC. May 24th.
1981	Presidential Address, Society of Gynecologic Oncologists, 12th Annual Meeting. "Why Invasive Cardiovascular Monitoring?" Marco Island, FL. January 11th.
1980	Hialeah Hospital, Education Seminar. "Phsiological Monitoring in Trauma Patients." Hialeah, FL. November 15th.
1980	Critical Care Seminar: ICU Nursing Symposium. University of Miami School of Medicine, Departments of Surgery and Anesthesiology. "Swan-Ganz Catheter: Does it Really Help?" and "ICU Computers: Help or Hindrance." Miami, FL. October 4th.

1980	III Update Course, Bilingual Program, University of Miami School of Medicine Departments of Surgery and Anesthesiology. "Fluids, Electrolytes and Alimentation." Miami, FL. August 5th.
1980	Kiwanis Club of Miami, 17th Division, Florida Kiwanis Districts. "New Directions in Emergency Medical Services." Miami, FL. July 25th.
1980	Computers in Critical Care and Pulmonary Medicine. "A Comprehensive Computer Generated Flow Sheet for the Intensive Care Unit" and "Experience with a Computer Activated Trend Detention Alarm for Mean Arterial and Atrial Pressures." Lund, Sweden. June 3rd
1980	Eighth Annual Intensive Care Symposium. First Annual Nursing Seminar on Intensive Care. University of Miami/Jackson Memorial Medical Center, Departments of Surgery and Anesthesiology. "Computers and Data Management: Help or Hindrance" and "A Guide Through the Computer Maze." Miami Beach, FL. April 25th.
1980	Second Annual James E. Holmes Memorial Symposium. Trauma: A Multi-Discipline Approach. "Respiratory Care of Traumatized Patient, Including Shock Lung." Melbourne, FL. April 11th.
1980	Critical Care Medicine. Orlando Regional Medical Center. "Critical Care Monitoring" and "Computers in the Intensive Care Unit." Orlando, FL. March 26th.
1980	Intensive Care Seminar at the Lawnwood Medical Center. "Applied Principles of Invasive Cardiovascular Monitoring." Fort Pierce, FL. Feb. 23rd.
1980	University of Miami, Intensive Care for Neurological Trauma and Disease: A New Decade. "The Role of the Computer in ICU." Bal Harbour, Miami Beach, FL. Jan. 24th.
1980	Postgraduate Seminar in Surgery, Art and Science in the Therapy of Difficult Problems in Surgery. University of Miami School of Medicine, "Common Electrolyte Disorders: Metabolic Fine Tuning." Bal Harbour, Miami Beach, FL. Jan. 16th.
1979	Computers in Cardiology. "Clinical Experience with a Microcomputer-Based Intensive Care Data Management System." New York. June 3rd.
1979	Computers in Critical Care Medicine and Pulmonary Medicine. First Annual International Symposium. "Clinical Experience with a Micro Computer-BasedIntensive Care Data Management System." Norwalk, CT. May 24th.

1977	Computers in Cardiology. "A Microcomputer-Based Data Management System for Intensive Care." Rotterdam, Netherlands. October 6th.
1977	Sixth Annual Scientific and Educational Symposium, Society of Critical Care Medicine. "A Computer-Based Patient Record System." New York. June 3rd.

Editorial Responsibilities

1993	Co-Editor. Trauma Informatics. Springer-Verlag New York Publishers.
1983 to 1985	Editorial Board. International Journal of Clinical Monitoring and Computing
1982	Professional Income Plan Billing and Collections Service Manual.

Study Section and Council Memberships

1991	Committee for Problems of DrugDependence. Palm Beach, FL. June. "Toxicology screens for cocaethylene in emergency department and trauma admissions associated with cocaine intoxication."
1977 to 1980	Member, National Academy of Sciences Committee on Hearing, Bioaccoustics and Biomechanics:
	Working Group No. 81 "The Effects of Long Term Exposure to Noise Upon Human Health."
	Working Group No. 85 "the Effects of Noise Exposure on the Human Being."

Consultations

1983	Design of Information System Howard Hughes Medical Research Institute Miami, Florida
1976	Design Bedside Monitor B & D Electronics Inc. Sharon, Massachusetts
1975	Design Computerized Bedside Monitoring Spacelabs, Inc. Chatsworth, California

Honors and Awards

1992	Certificate of Outstanding Performance Medical Records Committee Meeting
1976	Certificate of Appreciation Public Health Trust of Dade County
1965-1974	National Institutes of Health Medical Scientist Training Fellowship
1965-1969	Dade County Classroom Teachers Association Scholarship University of Miami Scholarships

BIBLIOGRAPHY

Scientific Articles

1. Mellman, T.A., Byers, P.M., **Augenstein, J.S.**: "Pilot Evaluation of Hypnotic Medication During Acute Trauma Reactions. Journal of Traumatic Stress. April, 1997 (In press).

2. Sharlt, J., Czaja, S., Dilsen, E., **Augenstein, J.S.**: "A System Analysis of a Trauma Center: A Methodology for Predicting Human Error." To be announced.

3. **Augenstein, J.S.**, Digges, K.H., Perdeck, E.B., Lombardo, L.V., Malliaris, A.C.: "Injuries Sustained by Air Bag Protected Drivers." The Engineering Society for Advancing Mobility Land Sea Air and Space International. (SAE) 1996 Technical Paper Series reprinted from Occupant Protection Technologies for Frontal Impact: Current Needs and Expectations for the 21st Century

4. Digges, K.H., Haffner, M., Lombardo, Stucki, L., Malliaris, A.C., **Augenstein, J.S.**, Perdeck, E.B.: "Challenges in Injury Measurement Technology for Testing of Driver Air Bag Systems." The XIV International Technical Conference on the Enhanced Safety of Vehicles. Melbourne, Australia. Paper no. 96-S10-O-02. May 15, 1996.

5. **Augenstein, J.S.**, Perdeck, E.B., Murtha, M., Stratton, J., Quigley, C., Zych, G. Byers, P.M., Nunez, D., Digges, K.H., Lombardo, L.V., Malliaris, A.C.: Injuries Sustained by Drivers in Air Bag Crashes." The XIV International Technical Conference on Enhanced Safety of Vehicles. Melbourne, Australia. Paper no. 96-S10-O-01. May 15, 1996.

6. Byers P.M., Block, E.F.J., Albornoz, J.C., Pombo, H., Kirton, O.C., Martin, L.C., **Augenstein, J.S.**: "The Need for Aggressive Nutritional Intervention in the Injured Patient - Development of a Predictive Model." The Journal of Trauma. December 1995.

7. **Augenstein, J.S.**, Digges, K.H., Malliaris, A.C., Perdeck, E.B., Lombardo, L.V., Stratton, J., Nunez, D., Jr., Byers, P.M., Quigley, C.V., Young, Young, P., Andron, J., Murtha, M., Craythorne, A.K., Zych, G.: "Liver Injuries Associated with 2-Point Belt Restraints in Frontal Crashes." Accident Analysis & Prevention Journal: The Official Journal of The Association for the Advancement of Automotive Medicine.

8. **Augenstein, J.S.**: "Accident Reconstruction in the Air Bag Era." Miami Medicine, The Official Publication of the Dade County Medical Association. May 1995

9. **Augenstein, J.S.**, Digges, K.H., Lombardo, L.V., Perdeck, E.B., Stratton, J.E., Quigley, C.V., Malliaris, A.C.: "Chest and Abdominal Injuries Suffered by Restrained Occupants." The Engineering Society for Advancing Mobility Land Sea Air and Space International (SAE) 1995 Technical Paper Series reprinted from Advances in Occupant Protection Technologies for the Mid-Nineties.

10. **Augenstein, J.S.**, Hotz, G.A., Nedd, K.J., Digges, K., Perdeck, E., Stratton, J., Murtha, M., Andron, J., Stitt, F.W., Craythorne, A.K.: "A Systematic Approach to Mild Traumatic Brain Injury in a Trauma Center." Journal of Neurotrauma. (Accepted for publication).

11. **Augentein, J.S.**, Digges, K.H., Lombardo, L.V., Perdeck, E.B., Stratton, J.E., Malliaris, A.C.: "Occult Abdominal Injury of Air Bag and Automatic Lap-Shoulder Belt Protected Crash Victims: A Challenge to Trauma Systems." Journal of Trauma, April 1995.

12. **Augenstein, J.S.**, Digges, K.H., Perdeck, E.B., Stratton, J., Malliaris, A.: "Airbag Protected Crash Victims - The Challenge of Identifying Occult Injuries." Engineering Society for Advancing Mobility Land Sea Air and Space International (SAE) 1994 Technical Paper Series reprinted from In-Depth Accident Investigation: Trauma Team Findings in Late Model Vehicle Collisions.

13. **Augenstein, J.S.**, Digges, K.H., Lombardo, L., Perdeck, E.B., Stratton, J., Malliaris, A.C.: "Injuries Sustained by Air Bag Occupants in Frontal Crashes." The XIV International Technical Conference on Enhanced Safety of Vehicles. Munich, Germany. May 25, 1994. (In Press).

14. **Augenstein, J.S.**, Digges, K.H., Perdeck, E.B., Stratton, J. Gonzalez, D.M., Craythorne, A.K., Andron, J.L., and Niblack P.R.: "Injury Studies of Frontal Automobile Crashes with Restrained Occupants." Symposium Proceedings Centers for Disease Control. Pp 87-95, May 20, 1993.

15. Buechter, K.J., Arnold, M., Steele, B., Martin, L., Byers, P., Gómez, G., Zeppa, R., **Augenstein, J.S.**: "The Use of Serum Amylase and Lipase in Evaluating and Managing Blunt Abdominal Trauma." American Surgeon, 1990. 56:4 204-208.

16. Mazza, J.F., Jr., **Augenstein, J.S.**, Kreis, D.J., Jr.: "Necrotizing Fascitis: A Rare Complication of Appendicitis." Southern Medical Journal, 1987. 80:9 1197-1198.

17. Peterson, E.A., **Augenstein, J.S.**, Hazelton, C.L., et al: "Some Cardiovascular Effects of Noise." Journal of Auditory Research, 1984. 24:50-68.

18. Peterson, E.A., Haselton, C.L., **Augenstein, J.S.**, et al: "Daily Noise Duration Influences Cardiovascular Responses." Journal of Auditory Research, 1984. 24:69-86.

19. Zuidema, G.D., Civetta, J.M., Egdahl, R.H., Anlyan, W.G., **Augenstein, J.S.**, Delguercio, L.R., Nardi, G.L., Drucker, W.R.: "Discussion: Cost Containment in Surgical Patients." Annals of Surgery, Vol. 198, No.3, September 1983, p.299.

20. Peterson, E.A., **Augenstein, J.S.**, Tanis, D.C., Augenstein, D.G.: "Noise Raises Blood Pressure Without Impairing Auditory Sensibility." Science. 211, No. 4489. March 27, 1981. p.1450-1452.

21. Peterson, E.A., **Augenstein, J.S.**, Andrews, G.F., et al.: "Clinical Experience with a Micro Computer-Based Intensive Care Data Management System." Computers in Critical Care and Pulmonary Medicine. 1980, p.265-267.

22. **Augenstein, J.S.**, Civetta, J.M., Andrews, G.F., Lustig, I., Konowalchuck, T.: "Clinical Experience with a Distributed Intelligence Intensive Care Data Management System." Computers in Cardiology, 1979. p.447-448.

23. **Augenstein, J.S.**, Civetta, J.M., Andrews, G.F., Lustig, I., Konowalchuck, T.: "Clinical Experience with a Micro Computer-Based Intensive Care Data Management System." Personal Computer Proceedings-National Computer Conference, June 1979, p.431.

24. Peterson, E.A., **Augenstein, J.S.**, Tanis, D.C.: "Continuing Studies of Noise and Cardiovascular Function." Supplement to: "Medical Effects of Environmental Noise Exposure." Ed., R. Rylnder, U Ahrlin and J. Vesterlund. Journal of Sound and Vibration, 59, No.1 1978, p.123-129.

25. Peterson, E.A., Tanis, D.C., **Augenstein, J.S.**, Seifert, R.A., Bromley, H.R.: "Noise and Cardiovascular Function in Rhesus Monkeys." Third International Congress on Noise as a Public Health Problem. Ed., J.F. Tobias. American Speech and Hearing Association (ASHA), Report No.10, 1980, p. 246-253.

26. Peterson, E.A., **Augenstein, J.S.**, Tanis, D.C.: "Continuing Studies of Noise and Cardiovascular Function." Journal of Sound and Vibration. 59, No.1, 1978, p. 123-129.

27. **Augenstein, J.S.**, Civetta, J.M., Hosek, R., Andrews, G.F., Vellon, N. Augenstein, D.G., Hilowitz, A.: "A Microcomputer-Based Data Management System for Intensive Care." Computers in Cardiology. 1977, p.425.

28. Gallagher, T.J., Civetta, J.M., Kirby, R.R., **Augenstein, J.S.**: "Post-Traumatic Pulmonary Insufficiency (PTP): A Treatable Disease." Journal, Southern Medical Journal. 70, 1977, p.1308-1310.

29. Peterson, E.A., **Augenstein, J.S.**, Hosek, R.S., Klose, K.J., Manas, K., Bloom, J., Lovett, S., Greenberg, D.A.: "Noise and Cardiovascular Function in Rhesus Monkeys." The Journal of Auditory Research. 15, 1975, p.234-251.

30. Klose, K.J., **Augenstein, J.S.**, Schneiderman, N., Manas, K., Abrams, B.: "Selective Autonomic Blockage of Classically Conditioned Cardiovascular Changes in Rhesus Monkeys." Journal of Comparative and Physiological Psychology, 89, No.7, 1975, p.810-818.

31. Schneiderman, N., **Augenstein, J.S.**, Klose, K.J.: "Cardiovascular Dynamics During Aversive Classical Conditioning of Rhesus Monkeys." Psychophysiology, 12, 1975, p.273.

Books and Book Chapters

1. Augenstein, J.S., Maull, Kimball: "Computers in Health Care". Textbook on Trauma Informatics. 1998 Springer-Verlag, New York, Inc.

2. **Augenstein, J.S.**, Peterson, E.A.: "Computerization: Solution to Problems in the Input, Manipulation and Storage of Intensive Care Unit Data." Textbook of Critical Care. 3rd edition; Ed., W.C. Shoemaker, S.M. Ayres and P. Holbrook, et al. Society of Critical Care in Medicine, (W.B. Saunders, Philadelphia, Pennsylvania, 1995 In press).

3. **Augenstein, J.S.**: "Trauma During Pregnancy." Trauma Management, Ed., D.J. Kreis, G. Gomez, (Little Brown & Co., Boston, MA, 1989). Chapter 17 Pp.417-429.

4. **Augenstein, J.S.**, Peterson, E.A.: "Computerized Intensive Care: Transforming Concepts to Needs." Critical Care, Ed., J.M. Civetta, R. Kirby and R. Taylor, (J.B. Lippincott Philadelphia, 1988) Part I - Section 5, Chapter 36 Pp.377-391.

5. **Augenstein, J.S.**, Peterson, E.A.: "CONTRL, A Computerized Medical Record System." Stemming the Rising Costs of Medical Care: Answers and Antidotes. (W.K. Kellogg Foundation, Battle Creek, Michigan. March 1988) Part Two - Pp.55-78.

6. **Augenstein, J.S.**, Peterson, E.A.: "Economic Considerations in Critical Care." Textbook of Critical Care. 2nd edition; Ed., W.C. Shoemaker, S.M. Ayres and P. Holbrook, et al. Society of Critical Care in Medicine, (W.B. Saunders, Philadelphia, Pennsylvania, 1988). Chapter 163 p.1465-1474.

7. **Augenstein, J.S.**, Peterson, E.A.: "Computerization: Problems in the Input, Manipulation, and Storage of Intensive Care Unit Data." Textbook of Critical Care. 2nd Edition; Ed., W.C. Shoemaker, S.M. Ayres and P. Holbrook, et al. Society of Critical Care Medicine, (W.B. Saunders, Philadelphia, PA, 1988). Chapter 27 p.259-269.

8. **Augenstein, J.S.**, Peterson, E.A.: "Managing Critical Care Resources: Use of Computerized Management Reports." Managing the Critical Care Unit. Ed., I.A. Fein and M. Strosberg. (Aspen Publishers, Rockville, Maryland, 1987) Chapter 4 Pp.47-67.

9. **Augenstein, J.S.**, Peterson, E.A.: "Computerization: Problems in the Input, Manipulation, and Storage of Intensive Care Unit Data." Diagnostic Methods in Critical Care. Ed., William Shoemaker and Edward Abraham, (Marcel Dekker, Inc., New York, 1986) Chapter 5 Pp. 87-110.

10. **Augenstein, J.S.**: "Use of Data Processing Systems in Clinical Decision Making." The Society of Critical Care Medicine, Critical Care State of the Art. Ed. W. Leigh Thompson and William C. Shoemaker, (Philadelphia: W.B. Saunders Co., 1982). Pp.162-164.

11. **Augenstein, J.S.**: "Surgical Intensive Care Unit Computerized Data Management System." Intensive Care for Neurological Trauma and Disease. Ed. Barth A. Green, Lawrence S. Marshall, T.J. Gallagher, (New York: Academic Press, 1982) Pp.125-129.

12. Civetta, J.M., **Augenstein, J.S.**: "Acute Respiratory Failure Following Surgery." Complications in Surgery and Trauma. Ed. Lazar J. Greenfield, M.D., (Philadelphia: J.B. Lippincott Co., 1982) Pp. 243-259.

13. **Augenstein, J.S.**: "Logic, Data Analysis, Decision Making, Prognosis." The Society of Critical Care Medicine, Critical Care State of the Art. Ed. W. Leigh Thompson and William C. Shoemaker (Fullerton, CA: Society of Critical Care Medicine, 1981) II p.(N)I-31.

14. Gallagher, T.J., **Augenstein, J.S.**, Civetta, J.M.: "Monitoring of Respiratory Function in Critical Care Patients." The Surgical Clinics of North America (Philadelphia: W.B. Saunders Co., Dec., 1980) 60. No.6, Pp.1437-1446.

Published Abstracts

1. R. Compton, S. Cohn, M. McKenney, G. Pozo, K. McKenney, D. Shatz, E. Ginzburg, O. Kirton, P. Byers, **J. Augenstein**, D. Sleeman: "Ultrasound Score Accurately Predicts the Need for Laparotomy in Blunt Trauma." [Accepted to be published by the American Association for the Surgery of Trauma], 1998.

2. D. Hristov, S. Cohn, M. Brown, M. McKenney, D. Sleeman, E. Ginzburg, D. Shatz, O. Kirton, P. Byers, **J. Augenstein**: "An Epidemic of Children Hit by Motor Vehicles." [Accepted to be published by the American Association for the Surgery of Trauma], 1998.

3. Civetta, J., Kirton, O., Hudson-Civetta, J., Gomez, E., Herman, M., Martin, L., Varon, A., Sleeman, M., McKinney, M., Shatz, D., Byers, P., **Augenstein, J.S.**, Ginzburg, E., Saunders, S.: "Decreased Costs and Shortened ICU Stary in Sicker Trauma Patients Treated to Prevent Ischemia-Reperfusion Injury." Accepted to be published by the Journal of Critical Care Medicine, 1997.

4. Hudson-Civetta, J., Civetta, J., Kirton, O., Gomez, E., Herman, M., Lynn, M., Martin, L., Varon, A., Sleeman, D., McKenney, M., Shatz, D., Byers, P., **Augenstein, J.**, Ginzburg, E., Saunders, S.: "Mitigating Increased Severity of Illness in Trauma Patients." Accepted to be published by the Journal of Critical Care Medicine, 1997.

5. Civetta, J., Hudson-Civetta, Namias, N., Kirton, O., Gomez, E., Herman, M., Lynn, M., Martin, L., Varon, A., Sleeman, D., McKenney, M., Byers, P., **Augenstein, J.**, Ginzburg, E.: "Do Sicker Surviving Trauma Patients Take Longer to Recover? Can Recovery be Shortened?." Accepted to be published by the Journal of Critical Care Medicine, 1997.

6. Kirton, O., Civetta, J., Hudson-Civetta, J., Gomez, E., Shatz, D., McKenney, M., Byers, P., Ginzburg, E., **Augenstein, J.**, Sleeman, D., DeHaven, B.: Gastric Intramucosal pH (pHi) Driven Resuscitation and Antioxidants: Normalized PHI is Associated with High Survival. Accepted to be published by the Journal of Critical Care Medicine, 1997.

7. Kirton, O., Civetta, J., Hudson-Civetta, J., Gomez, E., Windsor, J., McKenney, M., Byers, P.M., Ginzburg, E., **Augenstein, J.S.**, Sleeman, D., Varon, A., DeHaven, B., Shatz, D.: "Normalization of Gastric Intramucosal PH (PHI) in the Critically Injured Trauma Patient: An End Organ Directed Approach." (Submitted October, 1997)

8. Byers, P.M., Albornoz, J.C., Peterson, E., Mantelle, L.L., Carrillo, E.H., **Augenstein, J.S.**, Pombo, H., Najjar, R., Weinstein, J.: "The Effect of an Elementary School Bicycle Safety Course on Bicycle Helmet Compliance." Research report for presentation at The National Head Injury Foundation's 14th Annual Symposium, December, 1995.

9. **Augenstein, J.S.**, Digges, K.H., Lombardo, L.V., Perdeck, E.B., Stratton, J.E., Quigley, C.V., Malliaris, A.C.: "Liver Injuries Associated with 2-Point Belt Restraints in Frontal Crashes. Official Journal for the Association Advancement of Automotive Medicine: Accident Analysis and Prevention. (In Preparation).

10. P.M., Byers, J.C. Albornoz, E. Peterson, L.L. Mantelle, E.H. Carrillo, **J.S. Augenstein**, H. Pombo, R. Najjar, J. Weinstein: "The Effect of an Elementary School Bicycle Helmet Complicance." Journal of Trauma,. December, 1994.

11. P.M. Byers, E.J. Block, J.C., Albornoz, L.L. Mantelle, E.H. Carrillo, L.C. Martin, O.C. Kirton, **J.S. Augenstein**: "Critical Pathways in Trauma: The Need for Aggressive Nutritional Support in the Injured Patient - A Predictive Model." Journal of Trauma, December, 1994.

12. **Augenstein, J.S.**, Peterson, E.A., Augenstein, D.A., et al: "Demographic Financial and Outcome Analysis of Trauma Patients: Implications for Resource Use and Profitability in a DRG Environment." Critical Care Medicine. 16:4, Pp.408, April, 1988.

13. **Augenstein, J.S.**, Peterson, E.A., Engelman, E.B., et al: "Development and Utilization of a Computerized Medical Record System." Clinical Information Management: The Next Generation System. American Association for Medical Instrumentation. Los Angeles, 1987.

14. **Augenstein, J.S.**, Peterson, E.A. Engelman, E.B., et al: Developing, Testing and Using a Computerized Medical Record System in a Surgical Intensive Care Unit." 3rd Annual International Conference on Computerization of Medical Records-Creating Patient Information Systems. Institute for Medical Record Economics, Inc. Chicago, Illinois, 1987.

15. Peterson, E.A., **Augenstein, J.S.**, and Andron, J.: "Integration of Computer-Based Education into a Surgical Intensive Care Unit." Computers in Critical Care and Pulmonary Medicine. New York, 1985.

16. Snyder, J., Powell, M., Grenvick, A., Stickler, D., Civetta, J.M., **Augenstein, J.S.**: "Equivalency of Illness in Intensive Care." Critical Care Medicine. 6, 1978, Pp.125.

17. Civetta, J.M., Rappaporte, E., Etling, C., **Augenstein, J.S.**, Greenberg, M.: "Glucose, Insulin and Potassium: Results of Maximal Therapy." Critical Care Medicine. 6, 1978, Pp.93-94.

18. Gallagher, T.J., Smith, J., Civetta, J.M., **Augenstein,** J.S., Shea, S., Kirby, R.R.: "Acute Respiratory Failure: Evolution of Therapeutic Perspective." American Society of Anesthesiologists (Abstracts of Scientific Papers). 1977, p.191-192.

19. Snyder, J., Powell, M., Grenvik, A., Stickler, D., Civetta, J., **Augenstein, J.S.**: "Prognosis Equivalency of Illness and Cost/Benefit in Intensive Care. Critical Care Medicine. 3, No.3, 1977, Pp.214 (Abstract 427).

20. **Augenstein, J.S.**, Civetta, J.M., Etling, C., Klose, K.J, Gallagher, T.J.: "A Method for Quantifying Severity of Illness." Critical Care Medicine, 3, No.3, 1977, Pp.214.

21. **Augenstein, J.S.**, Civetta, J.M., Etling, C., Klose, K.J.: "A Problem Oriented Medical Record for Surgical Intensive Care." Critical Care Medicine. . 1977, Pp.214.

22. **Augenstein, J.S.**, Civetta, J.M., Hosek, R.S., Andrews, G F., Vellon, M., Augenstein, D.G., Hilowitz, A.: "A Microcomputer-Based Monitoring System for Intensive Care." Critical Care Medicine., 1977, 3:Pp.206.

23. **Augenstein, J.S.**, Williams, W.H., Shapiro, E., Kaiser, G.A., Ferrero, F.A., Fried, A., Civetta, J.M., Hosek, R., Shea, S.: "A Computer-Based Patient Record System." Abstracts of Original Papers, Sixth Annual Scientific and Educational Symposium, Society of Critical Care Medicine. 1977, Pp.64-65.

24. **Augenstein, J.S.**, Civetta, J.M., Etling, C., Klose, K.J.: "A Precise Descriptive Coding System for Intensive Care Diagnosis, Problems and Complications." Critical Care Medicine. 6, 1976, Pp.15.

25. Gallagher, T.J., Civetta, J.M., Kirby R.R., **Augenstein, J.S.**, Smith, J.: "High Level PEEP-Cost vs. Value." American Society of Anesthesiologists (Abstracts of Scientific Papers). 1976, Pp.321-322.

26 Hosek, R.S., **Augenstein, J.S.**, Schneiderman, N., Peterson, E.A.: "A Microprocessor-Based Physiological Data Recorder." 29th American Conference for Engineering in Medicine and Biology, 1976.

27. **Augenstein, J.S.**, Civetta, J.M., Herman, F.N., Schenkman, J.H., Shroder, N.M.: "Prediction of Survival in Intensive Care Patients." Critical Care Medicine. 4, 1976, Pp.107-108.

28. Civetta, J.M., **Augenstein, J.S.**, Herman, F.N., Schenkman, J.H., Shroder, N.M.: "Efficacy of Respiratory Support: Related to Indications, Mortality, Morbidity and Prediction of Outcome." American Society of Anesthesiologists (Abstracts of Scientific Papers). 1975, Pp.339-340.

Other Publications

1. Glorig, A., **Augenstein, J.S.**, Eagles, E., et al: "The Effects of Human Health From Long-Term Exposures to Noise." Committee on Hearing, Bioacoustics, and Biomechanics. Assembly of Behavioral and Social Sciences. National Research Council National Academy Press. Washington, DC, 1981.

2. Peterson, E.A., **Augenstein, J.S.**, Manas, J.: "The Relations of Protracted Noise Exposure to Changes in Cardiovascular Functioning." Meetings of Florida Chapter of the Accoustical Society of America. 1974, Pp.6.

OTHER PROFESSIONAL ITEMS

Doctoral Dissertation:

Augenstein, J.S.: "Components of Cardiovascular Responses to Classical Conditioning in Unanesthetized Rhesus Monkeys." University of Miami, 1974.

Master's Thesis:

Augenstein, J.S.: "Classical Conditioning of Heart Rate and Blood Pressure in Rhesus Monkeys." University of Miami, 1973.

Produced Surgical Intensive Care Video Tape Series

1981-1984

1. "Cardiovascular Physiology"
   Joseph M. Civetta, M.D.

2. "Bedside Monitoring"
   Joseph M. Civetta, M.D.

3. "Abdominal Sepsis: New Horizons in Managment"
Clifford Herman, M.D.

4. "Cardiovascular Therapy in the SICU"
J.S. Augenstein, M.D., Ph.D.

5. "Pathophysiology of Acute Respiratory Failure"
Joseph M. Civetta, M.D.

6. "Treatment of Respiratory Failure"
Joseph M. Civetta, M.D.

7. "Anesthesiology for the Critically Ill"
T. James Gallagher, M.D.

8. "Monitoring with the Swan-Ganz Catheter" Andrew Levy, R.E.M.T.

9. "Setting-up Flush Systems and Calibrating Transducers"
Mary Murtha, R.N.

10. "Management of Vascular Injuries"
Carlos Suarez, M.D.

11. "Introduction to Nutritional Support of the Hospital Patient"
Jacob Goldberger, M.D.

12. "Introduction to the SICU (User Friendly) Computer System."
Mila Dorotea, R.N.

Computer Systems Developed and Supported

1994 to Present — "Multimedia Auto Crash Study Data Base"
Client Server Hardware Microsoft Windows Visual Basics SQL Server
Installed Ryder Trauma Center
Miami, Florida

1991 to Present — "CARE Trauma Information System"
Multiple Client Server Hardware
M Technology Software
Installed Ryder Trauma Center
Miami, Florida

1989 — "Clinical Information Management System"
Hardware Distributed-Intelligence -
IBM - 9370 Model 50, PC, PS/2
Software - Operating System, IBM-VM

DOS OS-2; Languages, C and MUMPS
Installed University of Miami/Jackson Memorial Medical Center
Miami, Florida

1984 to Present	"Anesthesiology Department Resident Database Management System" Hardware - Digital Equipment Corporation VAX 11/750 Software - BASIC Language/INGRES Database Language/Statistical Package for Social Sciences Installed University of Miami/Jackson Memorial Medical Center Miami, Florida
1982 to Present	"Trauma/Surgical Intensive Care Data Base System" Hardware - DEC VAX-11/750 Software - Basic Language/INGRES Relational Data Base/Statistical Package for the Social Sciences Installed University of Miami/Jackson Memorial Medical Center Miami, Florida
1981-1984	"Professional Income Plan Billing and Collections System" Hardware - IBM System 38 Software - RPG III Language Installed University of Miami/Jackson Memorial Medical Center Miami, Florida
1981 to Present	"Surgical Intensive Care Data Management System" Hardware - DEC VAX-11/750 Software - Basic Language Installed University of Miami/Jackson Memorial Medical Center Miami, Florida
1980-1982	"Computer Aided Instruction System for Surgical Intensive Care" Hardware - DEC, PDP 11/34 Software - Basic Language Installed University of Miami/Jackson Memorial Medical Center Miami, Florida

N:Dr.A.:newcv.doc

Personnel

A percentage of Elana Perdeck's (Executive Director, William Lehman Injury Research Center and Jeffrey S. Augenstein's, M.D.,Ph.D.,F.A.C.S. (Professor of Surgery, Director William Lehman Injury Research Center) salary was paid by this grant.